MARINE REVIEW

WEEKLY.] AND MARINE RECORD. [ESTABLISHED, 1878.

Vol. XXVIII Eastern Office, 1023 Maritime Bldg., New York City. Chicago Office, 373 Dearborn St.

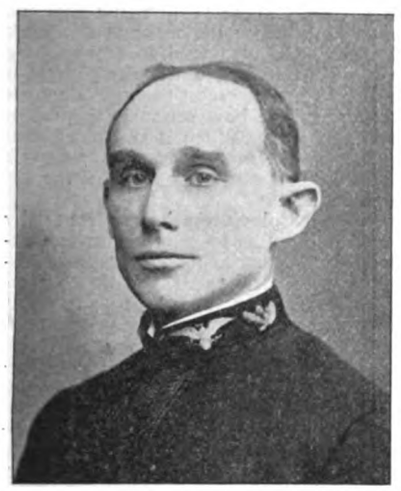
CLEVELAND, O., NOV. 26, 1903.
Published every Thursday at 39-41 Wade Bldg. by the Marine Review Pub. Co.
[Entered at Cleveland Post Office as second-class matter.]

Subscription $3.00 year. Foreign $4.50 year. Single Copy 10 cents.

No. 22

MEETING OF NAVAL ARCHITECTS AND MARINE ENGINEERS.

New York, Nov. 20.—Another very successful meeting of the Society of Naval Architects and Marine Engineers closed with the customary banquet at Delmonico's tonight. When the society was formed ten years ago, Mr. Clement A. Griscom, well known as a leader in Atlantic steamship service, was elected president, and each year since that time he has been re-elected to the same position. At last year's meeting Mr. Griscom was especially earnest in his thanks to the society for the honor of the presidency, but asked that the office be given to some one else at the end of the year. The council accordingly elected to the position this year Mr. Francis T. Bowles, late chief constructor of the navy, and who has been from the beginning a most active member of the society. Another important change was the election of Naval Constructor W. J. Baxter to the position of secretary-treasurer to succeed Rear Admiral Capps, recently made chief constructor of the navy. At the banquet the society presented Mr. Griscom with a handsome loving cup. This token of esteem for Mr. Griscom came not from a few, but from all the members of the society, as everybody was given opportunity to contribute a very small sum—all alike—towards the purchase of the loving cup. Senator Hanna and Governor-elect Myron T. Herrick of Ohio were guests at the banquet, and the recent endorsement in Ohio of Mr. Hanna's position on the matter of ship subsidies gave life to the addresses, which were, of course, along shipping lines.



President Francis T. Bowles.

Characteristic promptness was evinced by Mr. Griscom in calling to order at 10 o'clock Thursday morning in the auditorium of the Society of Mechanical Engineers, No. 12 West Thirty-first street, the first session for routine business of the society and for the discussion of papers. In the absence of Secretary Washington L. Capps, on account of the urgent duties of his new position at Washington, Mr. D. H. Cox, assistant to Mr. Capps, read the annual report. This report, dealing with the year ended Nov. 17, 1903, showed a membership of 896, divided as follows: Members, 450; associates, 306; juniors, 129; life members, 5; life associates, 4; honorary member, 1; honorary associate, 1. Receipts from various sources during the year amounted to $9,551.04; add to this a balance of $1,783.25 on hand at the beginning of the year, and the sum is $11,334.29; deduct expenditures for the year of $7,685.65, and the cash balance on hand is $3,648.64. The society's present worth is $20,971. It has no liabilities, with the following resources: Membership fees due from members after deducting doubtful accounts ($500.00), $2,214.00; due from dealers for volumes, $419.98; publications on hand as per inventory, 6,429.00; office furniture and equipment, $157.00; cash in bank, $3,400.56; cash on hand, $248.08; bond, $5,102.38; certificate of deposit, $3,000.00; total, $20,971.00.

By the death of Irving M. Scott and the election of Mr. Bowles to the presidency two vacancies existed among vice-presidents. The council decided to increase the number of vice-presidents by two, so that four names were submitted—Rear Admiral W. L. Capps, Rear Admiral C. W. Rae, Rear Admiral Robley D. Evans and Mr. Frank E. Kirby. New members and associate members of the council to fill vacancies are Naval Constructor J. H. Linnard, Capt. W. H. Brownson, U. S. N., Mr. W. D. Forbes and Mr. Chas. R. Hanscom.

Owing to increased duties and responsibilities as chief naval constructor, Rear Admiral Capps tendered his resignation as secretary-treasurer, to take effect as soon as the affairs of the office can be turned over to his successor—probably about Jan. 1. Naval Constructor W. J. Baxter, who was elected successor to Rear Admiral Capps, has always shown a great deal of interest in affairs of the society.

OFFICERS OF THE SOCIETY, NEW MEMBERS, ETC.

Full lists of vice-presidents and members and associates of the council follow:

Vice-presidents—Charles H. Cramp, Frank L. Fernald, U. S. N., Philip Hichborn, U. S. N., Charles H. Loring, U. S. N., George W. Melville, U. S. N., George W. Quintard, Edwin A. Stevens, Stevenson Taylor, W. L. Capps, U. S. N., C. W. Rae, U. S. N., Robley D. Evans, U. S. N., Frank E. Kirby.

Members and associate members of council.—W. Irving Babcock, Jas. E. Denton, Geo. W. Dickie, William F. Durand, Nat. G. Herreshoff, Ira N. Hollis, Wm. H. Jacques, John C. Kafer, U. S. N., Frank B. King, Jacob W. Miller, Albert P. Niblack, U. S. N., Lewis Nixon, Cecil H. Peabody, Walter A. Post, Harrington Putnam, Horace See, E. Platt Stratton, David W. Taylor, U. S. N., George E. Weed, J. H. Linnard, U. S. N., W. H. Brownson, U. S. N., W. D. Forbes, Charles R. Hanscom.

Executive committee—Francis T. Bowles, U. S. N., Lewis Nixon, Harrington Putnam, Edwin A. Stevens, Stevenson Taylor.

As already noted, the council, in submitting the list of officers, announced that Francis T. Bowles, late chief constructor of the navy, but now the president of the Fore River Ship & Engine Co., Quincy, Mass., had been made president. Applause greeted President Bowles as he ascended the platform to assume charge of the meeting. His address was extempore and very brief. He said:

"I thank you for the honor conferred upon me. I shall have pride and pleasure in acting as president. I feel especially the honor of an election to succeed Mr. Griscom, to whom the society is so deeply indebted. I know it is customary for the president to make a considerable address; but I am going to suggest that the address be delivered by the retiring president, in which event something might be expected a year from now. Probably the most encouraging thing I can now say is that the condition of commercial ship building is so bad that it cannot possibly get worse."

Then followed the reading of names of new members, associates, etc., approved by the council. They were all elected by the society. The list follows:

Members—Rear Admiral C. W. Rae, Washington; E. P. Bates, 228 W. Water street, Syracuse, N. Y.; Henry E. Frick, Marine department, Maryland Steel Co., Sparrow's Point, Md.; Robert Haig, surveyor to Lloyds Register, 846 North Sixty-Third street, Philadelphia; James R. Hampton, superintending engineer, Townsend-Downey Ship Building Co., Shooters Island, N. Y.; J. H. Mancoe, Lloyds Register of Shipping, 15 Whitehall street, New York; Edward L. Peacock, Midvale Steel Co., Nicetown, Philadelphia; George Stanbury, Lloyds Register of Shipping, 15 Whitehall street, New York; Carl W. Vollman, Linde British Refrigeration Co. of Canada, 301 St. James street, Montreal; William C. Wallace, John Brown & Co., Ltd., 116 East Seventeenth street, New York; H. Wilkinson, Bureau Veritas, 17 State street, New York; Arthur W. Thompson, Louis L. Berneir, Jas. H. Mull and Edward B. Hill.

Associates—Karl E. W. Alland, 521 Penn street, Camden, N. J.; William H. Balls, navy yard, Philadelphia; George K. Bradfield, Vacuum Oil Co., 29 Broadway, New York; Edwin F. Church, Jr., Lehigh University, Bethlehem, Pa.; James F. Clegg, Crescent Ship Yard, Elizabethport, N. J.; Leroy E. Caverly, Union Iron Works, San Francisco; John C. Craven, Crescent Ship Yard, Elizabethport, N. J.; Wm. L. Guillander, general manager, Old Dominion Steamship Co., New York; G. M. Lagergren, New York Ship Building Co., Camden, N. J.; George W. Neff, 141 Broadway, New York; W. H. Phillips, marine department, F. H. Devoe & C. T. Reynolds Co., New York; H. B. Saunders, marine surveyor and appraiser, 15 Whitehall street, New York; Edward M. Speakman, Fairfield Ship Building & Engineering Co., Glasgow, Scotland; Anson Phelps Stokes, 100 William street, New York; Geo. A. White, Hudson River Day Line, Desbrosses street pier, New York; L. Williams, Linde Refrigeration Co., 45 Broadway, New York; Paul G. L. Hilken, Eastern Ship Building Co., New London, Conn.; Alex. G. Boutakoss.

Juniors—Oliver M. Davis, Semet & Solvay Co., Ensley, Ala.; L. H. Kenney, office of inspector of machinery, U. S. N., William Cramp & Son Co., Philadelphia; W. J. Norton, Chicago Ship Building Co., Chicago; H. A. Staples, Clyde Steamship Co., New York; Ernst J. Thunberg, Bath Iron Works, Bath, Me.; J. M.

Generated on 2024-08-27 16:03 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

Winston, J. I. Thorncroft & Co., Chiswick, London; Martin C. Erismann, Marine Construction & Dry Dock Co., Staten Island, N. Y.; Arthur V. Curtis, Robert C. Simpson, Robert W. Binley, Albert E. Emen, Chas. C. Moss, Daniel Bailey, Edwin A. Stevens, Jr., and William Stanke.

Promotion from associate to member—Ralph E. Barry, 111 Thirty-Third street, Newport News, Va.; David W. Dickie, Moran Brothers Co., Seattle, Wash.; Thos. G. Roberts, navy yard, Mare Island, Cal.; Charles H. Thayer, Newport News Ship Building & Dry Dock Co., Newport News, Va.; Johan H. Norman, Cramp's Ship Yard, Philadelphia; A. MacMain, New London, Conn.; S. F. Smith.

Promotion from junior to member—Charles B. Page, marine and mechanical engineer, Baltimore; John H. Gardner, New York & New Haven Railroad Co., Newport, R. I.

Promotion from junior membership to associate—Edward G. Tuck, Eastern Ship Building Co., Groton, Conn.

MEMBERS AND OTHERS AT THE MEETING.

Com'dr A. G. Boutakoff of the Russian navy and Com'dr De Faramond of the French navy, both naval attaches at Washington, were in attendance at all the sessions. Following is a list of nearly all the members of the society who were present:

H. L. Aldrich	H. G. Gillmor, U. S. N.	L. J. Nilson
Roland Allwork	Clement A. Griscom	Lewis Nixon
Darwin Almy	Lieut. W. G. Groesbeck	J. J. Nolan
J. R. Andrews	F. Hanford U. S. N.	Geo. L. Norton
W. I. Babcock	Chas. R. Hanscom	D. C. Nutting
W. H. Bailey	J. F. Hanscom, U. S. N.	B. F. O'Connor
Joseph Barre	J. A. Hargan	Geo. I. Palmer
W. J. Baxter, U. S. N.	John Haug	N. F. Palmer
J. Beauchil	F. D. Herbert	Wm. F. Palmer
F. W. Belknap	W. E. Hill	J. V. Paterson
F. L. Bigelow	Gustav Hillman	C. P. Paulding
Wm. Binley, Jr	J. B. Hoover	C. H. Peabody
J. M. Blankenship	Com'dr Wm. Hovgaard	John Platt
F. T. Bowles, U. S. N.	W. D. Hoxie	W. A. Post
J. F. Bruton	Chas. E. Hyde	J. W. Powell, U. S. N.
C. H. Buckelew	Edward Hyde	W. F. Powers
G. H. Bull	John S. Hyde	H. G. Prout
C. S. Butts	J. Jonson	E. P. Robinson
W. L. Capps, U. S. N.	John C. Kafer	R. H. M. Robinson
H. Capdevielle	Jacob Katzenstein	A. A. Roberts
A. B. Cassidy	L. Katzenstein	C. B. Rowland
W. C. Church	O. B. Keller	T. F. Rowland
A. L. Colby	J. W. Kellogg	T. F. Rowland, Jr
Geo. C. Cook	W. L. Leland	A. H. Sabin
W. B. Cowles	T. C. Le Plue	S. Sabri
D. H. Cox	P. Leventhal	Prof. H. C. Sadler
Clinton H. Crane	T. P. Lewis	Horace See
F. H. Cross	J. H. Linnard, U. S. N.	A. R. Smith
Robert Curr	John Lloyd	A. G. Smith
N. Cushing	L. D. Lovekin	C. S. Smith
R. W. Davenport	Com. Chas H. Loring	John A. Smith U. S. N.
Richard Deming	Theo. Lucas	E. Platt Stratton
W. H. Deming	A. J. Maclean	Wm. P. Stephens
Joseph De Rycke	Geo. W. Magee	Col. Edwin A. Stevens
Wm. D. Dickey	H. A. Magoun	Geo. Stanbury
W. De W. Dimock	A. MacN. Main	Sinclair Stuart
Wm. A. Dobson	James W. McCormack	James Swan
Prof. W. F. Durand	Joseph Mc Creery	D. W. Taylor, U. S. N.
J. B. Edson	W. M. McFarland	A. D. Thresher
Wm. A. Fairburn	P. H. McGlehan	C. C. Thomas
M. Fargusson	H. L. Meeker	G. R. Tuska
F. L. Fernald, U. S. N.	J. W. Miller	C. M. Wales
E. P. Field	Spencer Miller	Geo. H. Waters
Andrew Fletcher	Thos. I. Miller	H. C. Watts
Wm. H. Fletcher	R. C. Monteagle	Geo. E. Weed
W. D. Forbes	D. G. Moor	F. M. Wheeler
D. E. Ford	A. Moritz, U. S. N.	Henri Wilkinson
Geo N Gardiner	Chas. D. Mosher	Henry Williams
Geo N Gardiner, Jr	Geo. Muller	W. C. Williamson
H. L. Gantt	R. L. Newman	B. F. Wood

READING AND DISCUSSION OF A LONG LIST OF PAPERS.

Immediately following the election of new members, associates, etc., the business of reading and discussing the program of papers was taken up. The first paper upon the program was upon the subject "Progressive Trials of Ferry Boat Bremen" by Col. Edwin A. Stevens, vice-president of the society. Col. Stevens has made exhaustive studies of the screw type of ferry boats and his paper had to do with his findings. In the progressive trials of the Bremen a value of .12 was assumed for w (wake factor) on the basis of single-screw trials of similar boats. This assumes that the race from the forward screw does not affect the wake factor. It was then assumed that at the lower speeds the wake factor for forward screw was practically zero. Comparisons of the analysis of the Bremen's trials and those of the Cincinnati and Bergen, previously obtained, were submitted, as shown in the accompanying tables. The object of the analysis was to get at the race augment and thrust deduction loss and not at the resistance. This latter must be assumed unless data of a single-screw trial is available. The calculations rest on assumptions of values for w (wake factor) at stem and bow and of hull resistance proper.

TABLE I. DISTRIBUTION OF I. H. P. AT 11 KNOTS.

	Bergen.		Cincinnati.		Bremen.	
	H. P.	%	H. P.	%	H. P.	%
Engine friction	115	16.4	124	12.9	175	18.5
Propeller losses	280	40	331	34.5	275	29
Race augment	55	8.9	88	9.2	209	22.1
Skin-friction resistance	155	22.1	191	19.9	178	18.8
Wave-making resistance	95	13.6	226	23.5	113	11.9
Total I. H. P.	700	100	960	100	950	100

TABLE II. DISTRIBUTION OF POWER DELIVERED TO SHAFT IN PER CENT.

	Bergen.	Cincinnati.	Bermen.
Propeller losses	47.8	39.6	35.5
Race augment	9.4	10.5	27
Skin resistance	26.5	22.9	23
Wave-making resistance	16.3	27	14.5
	100	100	100
Power delivered to shaft, H. P.	585	836	775

Prof. H. C. Sadler of Michigan University said of Col. Stevens' paper: "In connection with the new Staten island ferry boats I had occasion to go into the question of analysis of power with Col. Stevens, and one of the first points which we found necessary to know was the distribution of power between the bow and stern screw. The first assumption was that the true and apparent slip of the forward screw were the same, i. e., that there was no wake. But this is not necessarily the case. Two items have a very important bearing upon the performance of the bow screw, and these are the position of the propeller relatively to the bow of the vessel and the position of the bow wave. The disturbance caused by the bow wave and the stream live motion must influence the wake at the forward end of the ship, and at certain speeds it is within the realm of probability that this wake may be negative. It may be interesting to know that I estimated this wake by an independent method, and although my results differed numerically from those of Col. Stevens, the form of the wake curve was the same. Some criticism may be raised as to the choice of a wake factor of .12—for the after screw, as obtained from single-screw trials of other vessels. There is no doubt that the race of the forward screw must influence the wake at the after screw and therefore its efficiency, and also tend to increase the difference between the thrust deduction loss and wake gain; but on the whole I think it is perfectly just to credit the race augment with all this increase of power, as the bow screw is the direct cause of any loss incurred in this way. When it is noticed that there is a variation in efficiency in two practically similar vessels of from 10 to 15 per cent., the need of careful analysis of the various causes of loss of power is evident.

Mr. R. L. Newman considered Col. Stevens' paper especially interesting to an engineer and inquired as to whether turbine engines and water-tube boilers might be used in ferry boats to advantage. In replying to Mr. Newman Col. Stevens said that water-tube boilers had been used successfully in ferry boats, and mentioned especially the Thornycroft and Almy types as having been installed in ferry boats that had come under his observation. He added that there was no doubt as to the efficiency of the water-tube boiler itself but that the difficulty with it mainly lay in obtaining skillful firemen to handle it. He pointed to the fact that the Pennsylvania Railroad Co.'s ferries are equipped with water-tube boilers and are giving eminent satisfaction. Concerning the turbine, he said that it had been given careful consideration, that the efficiency of propulsion seemed to depend upon the slip of the propeller; that propellers of big diameter appeared to give the best satisfaction; that turbines seemed to involve the use of small propellers running with considerable slip and that not enough was known of them to warrant their adoption. He added also that the inability of the turbine to reverse would be a decided objection in a ferry boat and would practically involve the duplication of machinery—one set to be used for reversing purposes. In reply to a remark by Naval Constructor D. W. Taylor concerning hull resistance Col. Stevens replied that it was impossible to get at the actual resistance.

Mr. E. E. Roberts asked Col. Stevens upon what he based his observations that greater efficiency and skill are required to fire water-tube boilers. He maintained that they can be better got at by the firemen and that good results have been obtained by absolutely inexperienced help, saying that the boilers had been fired practically by passengers who shipped for a single voyage and worked their passage thereby. He added that an automatic regulator took care of the water level and would not show a variation of ½ in.

"As there is other business to be done," interposed President Bowles suavely, "I would suggest that Col. Stevens temporarily withdraw that special remark regarding water-tube boilers."

Mr. F. Meriam Wheeler inquired if the vacuum gauges of the Bremen had been verified and Col. Stevens replied that they had.

Col. Stevens in his reply also said that the point raised by Prof. Sadler as to the position of the screws relatively to the end of the vessel was one of importance as influencing the performance of the bow screw. He said also that the race from the bow screw affected the wake at the after screw. There was no doubt on that score.

Civil Engineer A. G. Menocal, United States navy, retired, was to have a paper on "The Isthmian Canal" but this subject having been very peremptorily settled during the past few days by the federal government President Bowles said that the paper had become superfluous.

The next paper, therefore, was by Mr. R. C. Monteagle of the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, New York, upon the subject "Notes on the Arrangement and Construction of Steam Pipes and Their Connections," which follows:

NOTES ON THE ARRANGEMENT AND CONSTRUCTION OF STEAM PIPES AND THEIR CONNECTIONS.

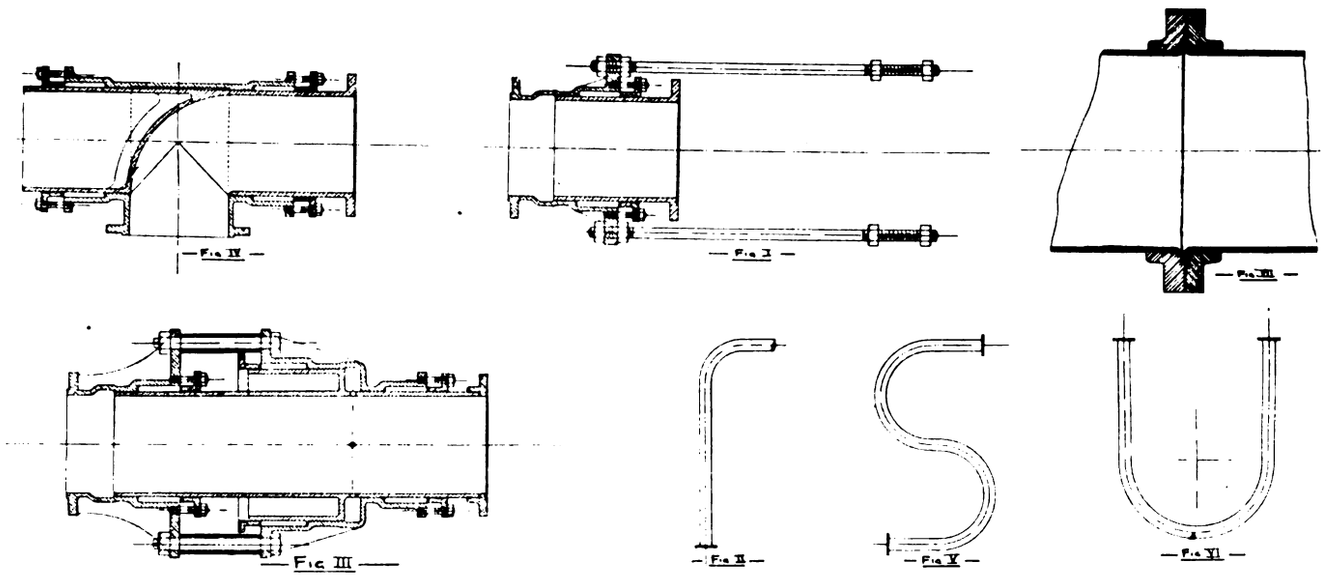
The principal object of this paper is first to point out and emphasize some of the causes of failure of steam pipes, and

Generated on 2024-08-27 15:57 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

second to describe some points in the general design, as well as material entering into the construction of steam pipes, which go far to insure their integrity under the most severe conditions of service. The subject is one which is becoming more important every year, owing to the rapidly-increasing steam pressures which are coming into such general use. The causes of failure in steam pipes may be classified as follows: First, faulty design; second, bad workmanship; third, defective material. The first of these, faulty design in some one of its many and varied forms, is in evidence in a remarkably large percentage of vessels. One of these forms of faulty design is in the employment of copper for pressures exceeding, say, 150 lbs per square inch. Owing to the number of accidents occurring with copper steam pipes, this material is being used less frequently in each succeeding year. The elastic limit of good sheet copper is reached at from 5,300 to 5,600 lbs per square inch, and the ultimate tensile strength about 30,000 lbs per square inch. In good steel pipe the elastic limit reaches from 30,000 to 35,000 lbs per square inch, and the tensile strength 53,000 to 60,000 lbs per square inch. These figures alone demonstrate the hopeless inferiority of copper for use in steam pipes as against steel. It may be accepted as a fact, also, that copper in the vicinity of brazing is more or less injured by the heating, and in some cases by the overheating, which they are subjected to, yet where copper steam pipes, say 6 in. in diameter and over, are used, the best practice is to *"make them up."* My reasons for so stating are that solid drawn copper piping of such diameter and the necessary thickness

formation of depressions, however slight, in the piping, or in other words, dropping from one plane to a lower and rising to the original plane again. When steam is turned on the body of water which has collected in this depression is set in motion and carried to the engine where damage is done or excessive strains set up. In any case, separators of ample capacity should be placed near the engine, so that they may collect any water in the pipes. An efficient separator is very desirable, as the entrainment of water by steam traveling at high velocities is always a source of anxiety to engineers. It is absolutely certain that after entrainment of water takes place no possible arrangement of piping can be made to carry such water back to the boiler without the intervention of an efficient separator. A method which will somewhat mitigate this evil is to superheat the steam as it leaves the boiler, and should the quantities of water carried over not be too great, this will possibly obviate the trouble. Objections to superheated steam are, however, great enough to rule this method out with the majority of engineers.

The second division of the causes of failure is *bad workmanship*. This may be subdivided again into bad workmanship at the mill and bad workmanship by the coppersmith or pipefitter who puts the piping in place. Bad workmanship at the mill is beyond the control of the users of steam pipe, whether the pipe be made of copper or of steel, and the following remarks are equally applicable to the manufacture of both kinds of pipe. It is nothing short of criminal on the part of the manufacturer of piping to neglect taking all the precautions possible to inspect



Arrangement and Construction of Steam Pipes and their Connections.

required is almost invariably of a non-uniform thickness, and frequently possesses the undesirable characteristic or tendency to split longitudinally.

This characteristic, it may be noted, seldom develops at the original time of testing, and hence its extreme danger. On the other hand, brazed copper piping never can possess the same strength as the original sheet from which it was made, even granting that the workmanship is exceptionally good. Rules are given for determining the thickness of copper to be used in steam pipes in the pamphlet issued by the board of supervising inspectors of steam vessels but they do not state that such thickness should be increased where bends occur. Almost any engineer is familiar with this requirement, but unfortunately there are individuals who deem it good practice to elude their duty when it is presented in this or other similar form. It is, therefore, important that this requirement be embodied in the said rules. A better rule would be to *prohibit the use of copper* for steam pipes which are subjected to pressures exceeding, say, 150 lbs per square inch, and which exceed, say, 3 in. in diameter. A glaring error which has been perpetuated from one edition to another in this pamphlet is where this phrase occurs: "The flanges of all copper steam pipes over 3 in. in diameter shall be made of *bronze or brass composition*, shall be securely brazed to pipe," etc. This, of course, should read "brazing metal." Another form of faulty design is frequently found in the method of allowance for expansion. The two ordinary methods are illustrated in Fig. 1 and Fig. 2. The method in Fig. 1 has the drawback of being unbalanced, and therefore must be furnished with *"preventer bolts"* so that the sleeve may not be forced out of place by the unbalanced pressure. The adjustment of these bolts must be accurately made or an undue strain will be brought on the piping, either when steam is turned on or when the piping is cold. The other method, in Fig. 2, is a simple dependence on the flexibility of the piping itself to take up the expansion. With piping, say, 3 in. in diameter and over this is not good practice, as the metal will become crystallized after constant working and is liable to crack or break at the most rigid point. This class of accidents has in various cases been fatal.

Another form of faulty design, and a common one, is in the

the material before, during and after the process of manufacture. Possibly this is done, but I regret to state that such is not my belief. On the contrary, my belief is that inspection at the mill is not rigid enough and that is why we have some of our failures of steam pipes.

IMPORTANCE OF INSPECTION OF PIPE WORK.

The builder of a steam vessel who installs all machinery, makes all connections, etc., is held responsible for this machinery, piping, etc., until the vessel is delivered, and frequently for a much longer time. Should any part of the piping fail, possibly causing loss of life, the builder is held responsible. Does this not seem unjust? If the fault be in defective piping, the onus of blame should be placed on the manufacturer of the pipe and he should be obliged to pay for the damage done. This method, if enforced, would undoubtedly result in better inspection at the mill and the production of better piping. Regarding bad workmanship by the coppersmith, it has been my observation that the greatest number of cases of bad workmanship in copper piping are directly connected with the brazing of flanges to pipes. The copper is frequently injured by excessive heating. To what extent the tensile strength of the copper is lessened by such bad workmanship it is very difficult to ascertain, but when such cases are discovered, however slight the burn, it is imperative to condemn the work. The heavier copper piping is, the greater danger there is from "burning" during the process of brazing joints, and hence further danger in its use for high steam pressures. The fitting of steam pipes of all kinds is a very important matter. Through the careless work, or bad judgment of pipe-fitters, strains are brought on piping which are a constant source of danger. Expansion may not be allowed for; joints made up where flanges do not meet fairly; proper allowance not made for gaskets; the making up of joints before vessels are launched and no allowance having been made for possible change of form. These are a few instances of bad judgment, or carelessness of pipe-fitters, and they might be multiplied. The inspection of this piping during the time of putting in place is therefore important and should receive the constant attention of individuals who first of all possess the

Generated on 2024-08-27 15:55 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

knowledge of what is required and whose duty it is to see that it is put in accordingly.

For the third division we have *"defective material."* We may consider all material defective which fails to satisfy safely the necessary conditions of its use. The failure to comply with these conditions may be due inherently to the *quality* of the material, or to the *kind* of material used. For the first of these we must hold the mill responsible and for the second the designer. The material worked up into piping, whether of copper or steel, should be, and no doubt is, subjected to tests to prove its fitness for the purpose required. The question then arises: Are these tests sufficiently severe to develop the possible fact of weakness or positive fracture? Should it not be made an absolute certainty at the mill that all steam piping shall stand the pressure for which it is intended? There is only one satisfactory method of doing this, and that is to subject each section of pipe to say not less than five times the working pressure required. As a matter of fact this is never done unless under direct instructions of the consignee. As before remarked, a characteristic or tendency to split longitudinally has been observed in solid-drawn copper piping of large diameter when subjected to high pressures, and this tendency seldom exhibits itself at the initial test. Nevertheless, the initial test will undoubtedly develop an existing weakness in however small a degree, even though that weakness be not manifest. A second or a third test at the place where the piping is installed may then fairly be expected to cause fracture in piping which is inherently weak. All steam pipe which is *"made up"* by the coppersmith should be tested in the same manner and as many times. The fact that a pipe fractures under a water-test pressure should never be considered a misfortune, however much it may appear so. It is a warning to be heeded, and the interpretation of the warning is to insist upon having better material and better workmanship.

I may now briefly enumerate some points in the general design, as well as the material entering into the construction of steam pipes, which will practically insure their integrity under the most severe conditions of service, if properly put together. In making a general arrangement of steam pipes two requirements of vital importance should be borne in mind—ample allowance for expansion must be made, and, if possible, there should be no "pockets" in the steam line. "Permanent" set will occur when metals are strained beyond the limits of their elasticity, hence the absolute necessity of proper attention to *"expansion."* Should permanent set occur, it is only a matter of a short time till fracture takes place, due to the brittleness thus engendered. Metals of all kinds subject to great variations of temperature and to varying strains are constantly changing their molecular structure. In copper piping, therefore, where the elastic limit is so low, this should be neutralized by annealing the pipe at well-advised intervals. The weight of piping and connections should be carried by carefully-arranged hangers suspended from deck beams and spaced at frequent intervals. These should allow perfect freedom of movement and at the same time be constructed so that the vibration will be absorbed.

An expansion joint made in either of the forms shown in Fig. 3 or Fig. 4 is a very satisfactory method of allowance for expansion, provided there is a good packing in the stuffing-box. It will be noted that either form is perfectly balanced. There are several good packings in the market for this purpose, but one notably so is a flexible metallic packing very much in use. Stuffing-boxes for this purpose should be exceptionally deep, as it is not necessary then to pack them so tightly, and as a consequence a freer movement is permitted to the sleeve. The expansion joint shown in Fig. 3 has an enlargement cast on the sleeve. This forms a piston at the end of the sleeve adjacent to the casting having the large stuffing-box. The end of this piston next to the large stuffing-box is open and is guided by same. In the sleeve below the piston, holes are drilled which permit the admission of live steam. The area of the piston on which the steam acts must be made equal to the area of the main steam pipe, and so while permitting perfectly free expansion it is also perfectly balanced.

The expansion joint in Fig. 4 is more simple than that in Fig. 3 and may be used to great advantage where a right or more acute angle is required in the main steam pipe. The sleeve is simply extended through the main casting and has a stuffing-box on both ends. In the sleeve is cast a deflective diaphragm turning the steam into the side branch. By giving a few figures it will be readily seen how important a function the balanced expansion joint performs, the importance of this function increasing rapidly as the diameter of the piping increases. Take for example a 15-in. steam pipe with 200 lbs working pressure of steam. The area of 15 in.=176.78; then $\frac{176.78 \times 200 = 35,336}{2,240}$ lbs or about 15¾ long tons unbalanced load on the steam pipe. With the ordinary type of expansion joint shown in Fig. 1, this unbalanced load must necessarily be taken up by the preventer bolts, subjecting these bolts and the castings to which they are attached to this strain. Two other good methods of allowance for expansion are shown in Fig. 5 and Fig 6, which are simply an S bend and a U bend, respectively. These should be used only in moderately-sized piping, as the larger the diameter of the pipe the more rigid it becomes, this rigidity being enhanced by the necessarily increased thickness of the material. An apparent drawback to this form is that it occupies much more space than an expansion joint, and the claim cannot be made that it is any lighter.

With the perfection to which the manufacture of steel pipe has been brought, the ideal steam pipe for high pressures has been realized. Add to this steel flanges welded to the pipe, each pair of flanges being made male and female, and having a wire insertion gasket between them, and we have reached the acme of steam piping at the present stage of steam engineering. It is true that in mercantile work such piping with welded flanges is too expensive and difficult to get to be used in the majority of cases. A good substitute is, where the pipe is expanded into the flange and turned over into a recess, formed in the flange for this purpose as illustrated at Fig. 7. This method has the very decided advantage of being readily fitted at the place of installment.

Appended to Mr. Monteagle's paper are the principal rules relating to steam pipes issued by the navy bureau of steam engineering, which, he says, seem particularly well fitted to mercantile requirements as well as to requirements of the navy.

EXPANDING, FLARING AND BEADING TOOLS FOR PIPE WORK.

Mr. Luther D. Lovekin of the New York Ship Building Co. complimented Mr. Monteagle very highly on his paper. "In the past four years," said Mr. Lovekin, "I have done a great amount of experimenting in this line and have spent thousands of dollars in inventing and perfecting expanding and flanging machinery and tools, which are about ready to be placed upon the market. The list includes all classes of expanding, flaring and beading tools, as well as tube cutters, and we have designed, and built them in all sizes from the small 2-in. boiler-tube expander, weighing 8 lbs., which is used in a pneumatic motor, to those for the largest lap-welded piping manufactured, and we are making at present a machine that will expand and bead or flange piping of 24 in. diameter and 20 ft. long. This machine weighs 20 tons and the tool alone will weigh over a ton. The practicability of all these machines and tools has been successfully demonstrated by numerous tests. I talked to the Franklin Institute, Philadelphia, Oct. 22, on this subject, showing the machines and tools in operation and exhibiting also samples of the work. I believe the joints made by me will in every case stand the test that any welded steel flange will stand, in as much as the shearing value of the grooves can be such as to cause failure of the pipe itself before leaking. With these machines and tools a joint can be made that will stand fully double the test pressure of joints made with any other known expander. This is due to the construction of the tool."

Mr. Lovekin submitted accounts of numerous tests of expanded and brazed pipe joints, made by the Quimby Engineering Co., Philadelphia, explaining them with the aid of blackboard drawings.

Mr. W. D. Forbes spoke in high terms of the thoroughness with which Mr. Lovekin had gone into expanding and flanging machinery of the kind just described. He also referred to his own inventions in making a tight joint but found later that his discoveries had been antedated by others but for some reason were not in common use.

Mr. R. L. Newman incidentally mentioned that he believed the ship builder should be criminally liable for the use of copper piping for the very high pressures when steel piping might be employed, which led President Bowles (now a ship builder) to remark that the criminal liability should rather be placed with those who buy the ships and those who inspect them.

DEVELOPMENT OF THE HIGH-SPEED MOTOR BOAT.

Then Mr. D. H. Cox, formerly an officer of the navy but now of Gardner & Cox, yacht designers of New York, read his paper on "Gasoline Engines for Marine Propulsion." In this paper, which we hope to print in full later on, Mr. Cox has collected a great deal of information regarding the advance of the gasoline engine and the development, especially within the past year or two of fast boats propelled by this kind of engine. Only a few extracts from the paper are here presented:

"The matter of weight for a given horse power varies very considerably among the different engines made in this country, some being more particularly adapted to racing and others to general work. Some makers make engines of different weights to meet the various conditions. Foreign motors, as a rule, are lighter than our own, approaching more nearly the automobile scale of weights. Personally, I think that the reasonably-heavy engine is a much healthier development than the extreme racing machine. It seems that we save enough in dispensing with boiler, stack, condenser, auxiliaries, piping, etc., to make a decent allowance to engine weight possible.

"In practically all the gasoline engines now on the market, with one notable exception, an initial charge must be drawn into the cylinders by cranking the engine over by hand before an explosion will be produced and rotation commenced, and when the engine is so started it runs continuously in one direction, reversal being impossible. Accordingly, to make it possible to stop and reverse the propeller, ether the connection between the engine and the wheel must be by gearing, or a feathering blade must be used in which the pitch can be altered at will by the engineer. The first method is the most frequently used perhaps, and by many is considered the more reliable, several very substantial and positive friction gear clutches being on the market so arranged that by manipulating a lever the tail shaft and crank shaft may either rotate as one or in opposite directions, or the tail shaft may remain idle while the engine turns over. Several very simple and effective feathering wheels are on the market also and give excellent re-

Generated on 2024-08-27 15:56 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

sults, the pitch of the blades being altered at will from a maximum go-ahead pitch, through zero, to a maximum backing pitch with the same direction of rotation of the shaft. The shafting in such cases is hollow, and a rod within it controls levers on the hub which revolve the individual blades on their axis. The fact that the engine must be run continuously during the changing from going ahead to reversal makes it evident that a method of governing should be provided to prevent racing during the change in load. This continuous running of the engine during short stops, when making landings, going alongside other boats, and, in general, when quick and positive starting is required, is, as a rule, quite objectionable, owing to the noise and vibration usually caused under these conditions.

"The speed of the engine is altered by changing the timing of the spark and also by throttling the gas supply. In all good designs both means of speed control are provided, and the throttle in addition is actuated automatically by a governor driven off the engine to prevent racing under release from load when stopping or running in a seaway. By a combination of these methods, and by the use of warm air, a large range of speeds and a considerable variation in the consumption of gasoline per horse-power hour is possible. Under the best ordinary conditions, when the gasoline vapor is in the proper proportion, the consumption does not vary greatly from one pint per horse-power hour, and this is the figure generally used in calculating tank capacities."

Mr. Cox referred especially to the Standard, a new design four-cycle engine made by the United States Long Distance Automobile Co., and presented illustrations, with descriptions, of a 110 H. P. Standard engine, as well as a 120 H. P. Leighton engine, made by Mr. H. T. Leighton, manufacturer and designer, who has turned out a great number of very fast boats. He also described a few of the racing launches in the vicinity of New York in which engines of this kind are installed—Adios, Standard, Dolphin, Express, and others,—for which speeds up to 24 miles an hour are claimed. In conclusion Mr. Cox says:

"The outlook for the continued increase in the use of gasoline engines for marine work is, in my opinion, most promising, and more particularly in engines of considerable size. Up to the present, the lack of confidence in engines of this type has, for most part, limited their use either to small launches or to vessels in which the power required was not great, and the installation of more than 100 H. P. in one hull has been quite an unusual event. With the confidence gained from experience with the improved marine engine, owners are now prepared to invest more money, feeling that they run but little risk of disappointment, and next season will see quite a fleet of power boats, from the hands of various designers, that will present many novel features, and with their high power and great accommodations will probably be very popular additions to the yachting fleet As an illustration of the saving in room effected, it may be stated that in a 75-ft. steam launch of recent design, with water-tube boiler and four cylinder triple-expansion engine of 175 H. P., the total length of boat given up to engine and boiler room was 18 ft., the whole width of the boat as well over this length being taken up to provide for bunker space and auxiliaries. A 175 H. P. gasoline engine (not a freak in any case) would require only an engine room of 12 ft. by 5 ft., saving 6 ft. in length, and leaving considerable space available on each side of the engine room hatch. Owing to the absence of auxiliaries two engines of this size, or 350 H. P., could be installed in this launch in the same 12 ft. of engine room. From the weight point of view one 175 H. P. gasoline engine would weigh about the same as the steam engine, thus saving the weight of boiler, piping, auxiliaries and feed water, as the coal may be offset by the oil carried, the total saving being about 15,000 lbs., or 30 per cent. of the total displacement. Even with 350 H. P. there would still be a saving of about 10,000 lbs. over the weight of the 175 H. P. steam engine.

DISCUSSION OF THE MODERN LAUNCH.

Mr. H. C. Sadler inquired whether any experiments had been made to determine the amount of gasoline used. Mr. Cox replied that he had no positive knowledge of such experiments but he thought the consumption as stated in his paper, a pint of gasoline per horse-power hour was about right.

Mr. W. P. Stephens, who has lately been making an exhaustive study of gasoline marine propulsion through extended correspondence with French makers and from personal observations of launches on the St. Lawrence river, thought Mr. Cox's paper especially timely, inasmuch as the gasoline engine is now being used, not alone in pleasure craft but in such commercial vessels as oyster boats, dories and fishing craft. He thought that the launch is just now tending to development upon French lines but maintained that the launch is really an American institution and that a member of the society, Mr. Charles H. Haswell, had had the honor of producing the first one in the early 20's of the last century. The naphtha launch, using naphtha as a fuel, was the first design; then followed the motor, utilizing gasoline in its explosive form. During the past fifteen years a great number of launches had been produced in this country but it had been left to the French to develop the high-speed launch, using in it the automobile four-cycle motor. They had greatly stimulated the development of the launch by projecting competitive races among themselves. Curiously enough up to within a year or two England had been content with the paraffine or ordinary kerosene motor but is now importing the American motor in great numbers. Mr. Stephens referred to the exposition which is now being projected at Monoca, which is to include all types for both pleasure and commercial purposes and where it is intended to generously distribute prizes for the best types. This exposition is international in its scope. He added that gasoline launches are not well classified in this country but that the National Motor Boat Association has lately been organized to systematize the various types and proposes to hold a general exhibition of motor boats in New York in February next. He referred to the performance of the motors Zaza and Pink on the St. Lawrence river during the present year, the Zaza, 35 ft. over all, reaching a speed of 11 miles in 35 minutes and the Pink, 21 ft. over all, reaching a speed of 15 miles an hour. This latter achievement he regarded as the best yet attained in the country, size considered. Much had been learned about motor propulsion from the automobile, especially on the subject of control. France was now, he added, considering the question of a substitute fuel for gasoline and to that end had offered inducements to agriculturalists to produce a cheap form of alcohol from farm refuse. Fuel alcohol may be obtained from a variety of waste matter and the government hopes by this means to obtain a cheap and abundant supply.

President Bowles dryly remarked that he was pleased to hear that the launch originated in the society over which he had the honor to preside, but he thought that the French had had something to do with it too, and called upon Com'dr De Faramond of the French navy, who was present, to speak upon the subject. Com'dr De Faramond begged the privilege of submitting his remarks in writing at a later date, owing to the timidity which he felt in expressing his ideas extemporarily in a language which was new to him. He added, however, that the French had met with some serious accidents in steam launches, generated by gasoline as fuel, and that this type stood at present in disrepute, especially for submarine purposes.

Mr. E. Platt Stratton in his remarks said that Mr. Charles Haswell had built a miniature steamboat in the early part of the last century. It was a side-wheel boat and could not properly be classed as a launch. The Collins Steamship Co. also made some experiments in Flushing bay in 1860 with a miniature boat, built by the Novelty Iron Works. The first steam launch in New York was built in 1860 by Joseph Lorillard, who introduced in it the square rotary engine. It operated only with a high-pressure cylinder and he encountered difficulties from exhaust steam, surface condensers not then having been developed. "To Mr. Lorillard I think," said Mr. Stratton "belongs the honor of developing the first steam launch in this country. He certainly worked long and faithfully in this direction."

Mr. Theodore Lucas said that he noted that launches invariably had shallow draught and high freeboard. He thought greater speed could be obtained by less freeboard and greater draught, and as they usually operated in sheltered waters they really did not need a high freeboard. He also thought that greater speed would be obtained if the flat stern was not immersed but was designed to be on a line with the water.

Mr. Clinton H. Crane spoke of the extremely light weight of the launch per horse power, being as low as 16 lbs. per indicated horse power.

Mr. M. Fargusson observed that unless the lines of launches are changed there can never be got out of them the speed of steam launches. Gasoline engines must be confined to small boats. To make them do the equivalent work of a steam launch would be to increase the weights materially. He regretted also that the general run of data concerning the performances of gasoline launches is unreliable. He thought that reliable data would aid materially the efforts to improve the launches, but recognized, of course, that commercial exigencies sometimes made it impossible to get at the actual results.

Mr. E. E. Roberts related that he was possessed of a steam launch, 55 ft. long, and that he had once seriously considered exchanging its triple-expansion engines and water-tube boilers for a gasoline mode of propulsion but discovered that to get at the same results that were obtained by steam he would have to materially increase weights and that the cost of gasoline as fuel would be four times that of coal. He confessed to some confusion regarding the literal definitions of launch and yacht. He did not know where a launch ended and where a yacht began. He thought the word launch was derived from a 27-ft. boat, formerly carried in the stern of naval vessels and not hung upon davits, which was called a launch because it actually had to be launched to get it into the water. But length apparently made no difference nowadays; if a cabin was placed upon a 27-ft. launch it became a yacht by virtue thereof.

Mr. Cox in reply admitted the extra actual cost of the gasoline but thought there was a compensating influence in that the gasoline launch required less help. One man could handle it and there was no question of banking fires involved. He also thought that possibly the consumption of gasoline is not down to the point to which it may eventually be brought.

An adjournment was then taken until afternoon.

INTERESTING PAPERS AT SECOND SESSION.

Design of Modern Steam Yachts, Watertight Subdivision of War Ships, Nickel Steel Boiler Tubes and Other Important Subjects.

In the temporary absence of President Bowles the afternoon session was called to order by Naval Constructor D. W. Taylor. The first paper read was upon the subject "Some Thoughts Upon the Design of Modern Steam Yachts" by Mr. Clinton H. Crane. Mr. Crane is of the firm of Tams, Lemoine & Crane, yacht designers of New York city. His paper was valuable mainly for the set of plans which it contained of the steam yacht Noma, 252

Generated on 2024-08-27 15:58 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

ft., length on load water line, and for a curve treating of speed and power of some of the yachts best known in New York and vicinity.

"Few realize the great growth of our steam-yacht fleet in the past decade," says Mr. Crane in his paper. "In the spring of this year the yacht register shows 433 steam yachts of American ownership, with a total gross tonnage of 58,669.23; of these 253, with a gross tonnage of 28,306.35, have been built since 1890, and thirty-three, with a gross tonnage of 18,765.12, are of English design and build. One hundred and eight of these vessels, gross tonnage 47,277, are over 120 ft. water-line length. As a natural consequence of this large number of yachts built, certain well-defined types have developed, which experience has shown best meet the varying requirements of the American owner. Every modern steam yacht is either used as a ferry-boat for taking the owner from his country place to the city, or as a cruising vessel on which he lives and visits distant parts of our own coast, and often distant parts of the world. Most vessels up to 120 ft. water line are of the ferry-boat type, though there are notable exceptions of good cruising yachts under this size.

"It is not possible to overstate the boon to our steam yachting of the coming of the first English steam yachts. Before their advent, with hardly an exception, our fleet was composed of low-sided, herring-gutted boats, with good speed as a rule, but suited only for sound and river use and an occasional dash around the cape after careful waiting for good weather. The English boats have with few exceptions been little ships, capable of keeping the sea in all weathers, slower in calm weather than our boats, but capable of maintaining their speed in seas that would drive our designs to harbor.

"These English boats had another thing which our boats lacked, and that was style. The English influence can be seen in all our modern yachts, and with the exception of a few high-speed boats designed primarily as ferry-boats between the owner's country place and the city, there is hardly a boat which cannot comfortably keep the sea. In the matter of speed, however, we have not been content to follow our English cousins, as the following figures show: Of 122 yachts over 100 ft. load water line built in America since 1890, 106 are fitted with some type of water-tube boiler and sixteen with Scotch. Of the thirty-three English yachts, thirty are fitted with Scotch and three with water-tube, and of these three two have been fitted in this country. In the past ten years thirty-three steel yachts have been built in America over 140 ft. load water line, and of these twenty-three are fitted with water-tube boilers, while all of the twenty-seven American-owned English-built boats over 140 ft. water line are fitted with Scotch boilers."

This claim as to speed Mr. Crane supports by submitting a drawing of a typical yacht speed curve with a speed equal to the square root of the vessel's length taken as unity and the power required for this speed as 100. The names of the following representative larger yachts are shown on this curve.

Name.	Load water line, feet.	Speed knots.
Kanawha (American)	192	19.67
Colonia (American)	163	17.00
Helenita (American)	154	16.00
Noma (American)	225	19.14
Corsair (American)	252	19.00
Rambler (American)	148	14.00
Margarita (*Eng.-Amer.)	272	17.00
Riviera (English)	163	13.00
Mayflower (*Eng.-Amer.)	275	16.75
Wanderer (English)	173	13.00
Tuscarora (English)	170	13.00
North Star (English)	219	14.00
Nourmahal (American)	227	14.00
Delaware (English)	216	13.50
Niagara (American)	247	14.00
Conqueror (English)	176	12.00
Narada (English)	194	12.00

*English yachts built for Americans.

Mr. Crane continues: "The English yacht showed us what could be done in sea-going qualities and comfort, but the American owner was not satisfied with her speed, nor with such minor details as ventilation and plumbing. He did, however, wish to retain her sea-going qualities and the style of her appearance outside and on deck, and he has set us the problem of retaining these desirable features at the same time materially increasing the speed and adding to the weight of plumbing and skylights. Fortunately for the success of the problem any large English yacht, in addition to being more heavily built than Lloyd's requirements, carries a reasonably large amount of ballast. The American yacht has made its gain in speed in three ways—finer lines, lighter machinery, which includes the use of water-tube boilers, and in many cases lighter scantling and equipment. In the question of scantling, however, we are seldom given a free hand; the average owner wishes his yacht built very strongly, and as Lloyd's and our American Bureau of Shipping have laid down certain sizes which they consider necessary for vessels of a certain size, the owner is very apt to consider anything lighter than this unsafe. He, furthermore, is unwilling to make sacrifices in his living quarters. They must be just as large and just as handsome as those of his friend who owns a modern English yacht of about the same size, but of several knots less speed. Naturally we have had to look for this increase through machinery. The fast yacht, like the fast, warship, is rarely called on to show her maximum speed. Therefore, in spite of the increase of boiler pressure due to the water-tube boilers, it has not seemed wise to increase the cylinder ratio. The fact that most of our yachts are coming and going frequently through the East river has placed a limit to desirable size. A boat of 225 ft. water line is unhandy enough in the swift tide running through Hell Gate to make the daily trip a most unpleasant one to her officers."

As previously noted, Mr. Crane submitted with his paper, as a late answer to the problem of modern yacht design, plans of the steam yacht Noma, built last year from his firm's designs by the Burlee Dry Dock Co., Staten Island, New York. Particulars and general dimensions of this yacht are: Length, over all, 252 ft.; length, load water line, 226 ft.; beam, 28 ft. 5 in.; depth, 18 ft. 3¼ in.; draught aft 14 ft., forward 12 ft., mean 13 ft.; displacement on trial, 1,035 tons; prismatic coefficient, .601; speed, 19.06 knots; engine, four-cylinder triple, 17, 27, 32 and 32x24 in.; revolutions on trial, 205; indicated horse power, 4,200; boilers, six Almy water-tube; heating surface, 9,005 sq. ft.; grate surface, 221 sq. ft.; blower system, closed stokehold; air pressure in stokehold, 2½ in.; three blowers of 54 in. diameter, 500 revolutions, 20 in. at tips; two three-bladed propellers of 9 ft. diameter and 11 ft. pitch; bunker capacity, 230 tons; coal on trial, 150 tons; fresh water capacity, 12,500 gallons.

"In choosing the Noma's boilers," says Mr. Crane, "room was of far more importance to us than weight. As a matter of fact, we obtained 6.98 H. P. per square foot of boiler room on the trial trip, a result which can only be exceeded, and that very slightly, by boilers of the Normand or Yarrow type. The advantage which the Almy boiler has over any of the usual express type of boiler is the ease of repair, and I may as well confess that I am continually surprised at the tightness of the screw joints of boilers of this type. In our experience the tubes always give out between the joints, if at all. The Noma's speed on trial was slightly bettered in an ocean race on July 24 last against the Kanawha. The contract requirements called for 18½ knots under forced draught and 16 knots under natural. The Noma is fitted with large bilge keels, which apparently do not interfere with her speed. In structure she is built to the requirements of the American Bureau of Shipping, and is fitted with two more bulkheads than required. It may be interesting to note that 37½ per cent. of the displacement, exclusive of coal, water and stores, is given up to outfit and joiner-work, and only 22 per cent. to machinery."

Prof. H. C. Sadler said that the design and construction of light steam yachts acts in the nature of experimental work for other branches of the profession. He believed that the work in steam yacht construction is getting the people to use the water-tube boiler. He was glad to hear that Mr. Crane's experience with screw joints in boilers had been favorable, for while he believed in them himself, he had heard others condemn them.

Col. Stevens raised a question as to standard form of yachts. The accepted type of yacht has a clipper bow and English cutter stern. He thought this represented an expenditure of weight and bulk which might be incorporated amidships to better advantage. He asked the reason why the style was adhered to. Was it on account of its supposed beauty. He thought that a clean, workmanlike thing, designed to perform its office to the best advantage, was more beautiful than a form which appeared to have nothing more to recommend it than that it was a revival of an old type of construction.

Mr. A. A. Packard declared that it was merely a matter of style and that the owner virtually demanded it. They believed the Corsair and Noma to be beautiful objects and they wanted their yachts to be built like them.

Naval Constructor Taylor related that he had known owners to object to bilge keels on the ground that they retarded the speed of the yacht. To satisfy himself he had tried two yachts, one with bilge keels and the other without them, and the yacht with bilge keels had a little the better of it in the trials. He had also experimented in the model basin at Washington with a 20-ft. model and discovered that bilge keels do not especially increase resistance. He had also tested models with fine and full ends and had not found much difference between them until the highest speed was reached when the model with full ends appeared to have the best of it; from which he concluded that after a certain speed it merely became a matter of brute strength.

Mr. E. E. Roberts said that water-tube boiler men are not worrying much about yachts, for the reason that 90 per cent. of the steam yachts have water-tube boilers and that 90 per cent. of the boilers have screw joints.

GENERALLY AGREED THAT PROTECTIVE CRUISER TYPE IS OBSOLETE.

Com'dr William Hovgaard of the royal Danish navy, who is a professor at the Massachusetts Institute of Technology, then read his paper upon the subject of "Watertight Subdivision of Warships." He showed the need thoroughly of watertight bulkheads and made an especial point of the fact that the development during late years of high explosives and their added velocity has rendered the protected cruiser obsolete. An explosion would render such mischief to her practically unprotected sides that bulkheads would be of no avail to save her. He regarded the design as obsolete.

Mr. Theodore Lucas declared that Prof. Hovgaard had rendered an important service in the thoroughness with which he had gone at his work but he regretted to hear him say that he regarded the protected cruiser as an obsolete ship. He thought a large protected cruiser had eminent advantages in scouting at hig

Generated on 2024-08-27 16:03 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

speed and that it could be designed to have reserve buoyancy, even if extremely injured.

Col. R. M. Thompson detailed at length the collision of the British cruiser Hannibal with the Prince George, which resulted in disabling the rudder, rendering inoperative the lighting plant and smashing a big hole in her side through which the water poured in torrents. Yet the crew were able to stop up the compartments and confine the water to the injured portions of the ship, and then by keeping the pumps working were enabled, by steaming all night, to reach port. He added that he had had the pleasure of witnessing the maneuvers of the British squadrons last summer and observed that the protected cruisers never left the sheltering wing of a battleship while an armored cruiser was in sight. He believed that they performed no service whatever during the maneuvers except to unnecessarily expose the crew.

"I am glad that Prof. Hovgaard holds that the large-sized protected cruiser is obsolete," said Naval Constructor Taylor, "for it coincides with my own opinion. We are now building some large protected cruisers and I regard it as so much money wasted. When the Camperdown sank the Victoria she was moving at about 4 knots per hour. That was the only thing which saved her. Had she been moving at 12 knots she would have assuredly gone down with the Victoria. It is generally agreed that watertight doors should not be placed below the water line but it has been found impracticable not to have them there."

In closing the discussion Prof. Hovgaard maintained that armor should be placed vertically on the sides of the cruisers and not sloping on the deck.

GREAT CLAIMS FOR NICKEL STEEL IN BOILER TUBES.

Mr. Albert Ladd Colby then took up his paper on "Non-Corrosive Nickel Steel Boiler Tubes," which was listened to closely. Mr. Colby is connected with the International Nickel Co. His paper dealt with the successful manufacture in America, on a commercial basis, of a new boiler tube, practically non-corrosive, he said, and of much higher tensile strength than the tube now in use. These desirable properties are obtained, Mr. Colby stated, by introducing, during the manufacture of the steel, a large percentage of nickel. He exhibited at the meeting numerous samples of the tubes, 30 per cent. nickel, made by the well-known Shelby company. The tubes were first made in a commercial way in France, in 1898, and a little later on in Germany. Since then they have been under practical trial in the French, German and Dutch navies with gratifying results. Mr. Colby submitted with his paper results of a series of exhaustive tests of the tubes made by Mr. A. F. Yarrow of water-tube boiler fame in England. "The consensus of opinion abroad," he said, "is that these tubes will last at least two and one-third times longer than mild carbon steel tubes. The American tubes, having only just been successfully manufactured, have not yet been submitted to a practical trial for marine boilers. It is perfectly safe, however, to state that the American tube will have as long a life as the foreign tube, and probably a somewhat longer life, from the fact that the foreign tubes contain from 23 to 25 per cent. of nickel, whereas in the manufacture of the American tubes it was decided to use a 30 per cent. nickel steel, so as to still further increase the resistance of the tubes to corrosion. The American tubes have recently been put under trial in stationary boilers, locomotive boilers, automobile boilers, and in the very near future they will be given a practical trial by the navy, both for boilers and condensers, and possibly also for superheaters. The exhibits include 30 per cent. nickel steel tubes of American manufacture, varying from ⅝ to 4 in. outside diameter, and of the usual range in gauges. They also include 'beading' tests, and 'expanding' and 'flattening' tests, which show that they more than meet all the manipulating tests required by the navy bureau of steam engineering. Among foreign samples in the exhibit is one of the ordinary carbon steel tubes, and it is interesting to compare the marked corrosion of this tube with the 25 per cent. French nickel steel tubes, which show no evidence whatever of having corroded. Increased cost is the only disadvantage with these tubes, but they are offered here at lower cost than is demanded by the French and German makers. Advantages of the high nickel steel tube are:

"1. High tensile strength in comparison with that of mild carbon steel.

"2. Entire absence of brittleness, as evidenced by the severe manipulating tests which they will stand.

"3. Higher elastic limit, which prevents leaks where the ends of the tubes pass through the flue-sheets. Expansion of the flue-sheets, when heated, compresses the tube at the point where it passes through the flue-sheet, and in the mild carbon steel tube, with its low elastic limit, this causes a permanent deformation, which results in leakage and necessitates expanding the tubes. High nickel steel, with its much higher elastic limit, resists this compression.

"4. Resistance to corrosion, as proved conclusively by Mr. Yarrow's tests, which are before you.

"5. Saving in weight made possible by the lighter gauges of the nickel steel tubes, which are perfectly safe owing to the increased tensile strength. There is a saving in weight in stationary boilers of over 2 tons in a boiler installation of 500 H. P. and no less than 8.6 tons in an installation of 2,000 H. P. In the case of the torpedo-boat destroyer Hopkins, which was taken as a standard, the adoption of a No. 14 gauge tube in place of the tube now in use of No. 11 gauge, makes a saving in weight of no less than 24,881 lbs., or 11.1 tons, and similarly, in the battleships Rhode Island and New Jersey, the saving in weight amounts to 85,093 lbs., or no less than 38 tons.

"It is unnecessary for me to call the attention of marine engineers to the importance of these figures; nor do I need to more than refer to the practical advantage of the use of a lighter gauge in the saving of fuel due to the extra steaming efficiency of a boiler equipped with lighter-gauged tubes.

"The only disadvantage of these tubes is their cost, which per pound is about three times that of mild carbon steel tubes. The 1⅛-in. tubes used in torpedo-boat destroyers which now cost 15 cents a pound will if of nickel steel cost 45 cents a pound, and for the 2 and 4-in. tubes used in battleships, now costing 12 cents a pound, the price will be 35 cents a pound. This difference in cost is reduced in the first place by salvage that can be obtained in the sale of the nickel steel tubes when they are finally taken out of the boiler. Old tubes can be sold at 6.4 cents a pound. The costs per pound are furthermore not directly comparable, owing to the fact that less weight of the nickel steel tubes is purchased, on account of their lighter gauges, and when it is borne in mind that these tubes have a life of at least two and one-third times that of the mild carbon steel, the increased cost is really more than offset by the expenses incident to the more frequent re-tubing of the boiler when mild carbon steel tubes are used; this to say nothing of the expense and annoyance of putting vessels more frequently out of commission for repair of boilers."

Col. R. M. Thompson in discussing Mr. Colby's paper said that he did not think Mr. Colby had presented the saving of cost in as many ways as he might. He figured that battleships cost approximately $500 per ton and that the saving of each ton of weight is $500 saved. Nickel steel tubes, being lighter than mild carbon steel, would result in a saving of weight of 58 tons in a battleship, which is the practical equivalent of $20,000. He believed that this amount should be deducted in order to fairly arrive at the extra cost of nickel steel. By the same reasoning a torpedo boat costs practically $1,000 a ton and as nickel steel tubes would result in a saving of 10 tons it virtually meant a saving of $10,000, which should also be deducted in arriving at the actual cost of nickel steel. He said that the boilers of a vessel always caused the most trouble, taking the various parts of a vessel as a unit, and anything that tended to improve their efficiency should be encouraged.

Mr. E. E. Roberts asked whether nickel steel had a tendency to prevent the adhesion of oil or scale, but Mr. Colby gave no information on that score.

Mr. John Platt said that the question of wear was an important one, that some tubes gave out in twelve months, others in six and some lasted years; but that if nickel steel had a wearing life two and a half times greater than mild carbon steel it was a highly important discovery.

"Will cold bending affect nickel steel?" asked Col. Stevens.

"There is absolutely no deficiency in cold bending in nickel steel," replied Mr. Colby. "It does not have as high a contraction of area as carbon steel. Moreover if you plunge nickel steel red hot into water it will soften instead of harden—in other words it acts precisely the reverse of carbon steel under such conditions."

CURVES OF FORM OF INITIAL CONDITION.

Mr. George Crouse Cook then read his paper upon "Curves of Form of the Initial Condition."

This paper which is largely a matter of detail and data, supplemented by a large number of plates and drawings, can be satisfactorily described by extracts from the author's introduction and conclusion as follows: "The fundamental principle of the displacement of floating bodies requires an accurate knowledge of the volume of the underwater form of every vessel for successful design. Following the lead of this most elementary condition, it may be safely said that the more complete the knowledge of the distribution of this necessary volume, the more certainly may the design be developed to give the desired results. In addition, this knowledge or data, carefully and completely recorded for a series of approved vessels of various types, will serve as an excellent foundation for the design of new vessels of similar classes. Furthermore, original ship calculations are greatly facilitated by reference to completed corresponding curves, and, also, the accuracy of the work may be checked more satisfactorily by these curves than is possible by repeated literal calculations. To promote this end, then, has this paper been prepared—that I might give a specific knowledge of a simple method of calculating and recording (by curves) the data of form which I have found useful in designing, and, at the same time, to supplement this information by examples of these curves for vessels of various types which will serve as data in actual practice or be of guidance in the execution of similar original calculations. Nearly every result found in the field of ship calculations is necessarily a function of the form of the hull, and, therefore, to bring this paper within reasonable limitations I have restricted the calculations to the upright or initial condition of the vessel, with variations in the draft from 0 to the designed load draught. These independent consecutive values of any property may be plotted at the points in the draft for which they were calculated and a curve drawn through them to give a graphical representation of the variation, and, also, to enable intermediate values of these properties to be found by measurement from the curves.

"A primary classification of these initial curves may be found in: First, those that record the horizontal distribution of areas and centers; second, those that record the vertical distribution of areas, volumes, and centers; third, those that record the conditions of initial stability as a direct function of the form. The

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

curves of the first class give records of the transverse sectional areas, the centers of gravity of water planes, and the horizontal positions of the centers of buoyancy. In the second class are the records of the water plane areas, the midship section areas, the weight of displacement, coefficients of areas and displacement, tons per inch immersion, varying drafts in salt and fresh water, areas of wetted surface, vertical positions in centers of buoyancy, and the connections for displacement in trimmed conditions. And finally, under the third head, are the curves of transverse and longitudinal metacenters, and moments to alter trim."

Following this introduction came a complete and exhaustive discussion of the execution and plotting of each of these curves for a large vessel of the intermediate cargo and passenger kind which was fully illustrated by detailed and general diagrams. The paper was then closed by a general discussion of the practical uses of these curves in completing the design of the ship upon which they were calculated, on board the completed ship in actual service, and in the preparation of the design of new vessels of similar types.

After Mr. A. E. Luders had told Mr. Cook that he did not believe that he had pursued the curve of the initial condition far enough and Mr. Cook had replied that he had in so far as he intended to illustrate his meaning, an adjournment was taken until Friday morning.

SECOND DAY'S PROCEEDINGS.

Society Put Itself on Record as Opposed to the Adoption of the Metric System—A Day of Spirited Discussion.

Friday morning's session was called to order by Mr. Walter M. McFarland, who made an excellent presiding officer. The first paper was upon the subject "The Metric System in Relation to the Ship Building Industry of the United States," by Naval Constructor J. H. Linnard. This paper was very comprehensive and was substantially as follows:

The controversy over the adoption of the metric system in the United States has aroused a great deal of attention, but an attempt to review the arguments pro and con would extend this paper to such length that a volume of the society's transactions would not be sufficient to hold it. The advocates of the use of this system have, however, carried their propaganda into the national legislature, and, as a result of their efforts, bills were introduced into the last congress, which were considered by the house committee on coinage, weights and measures. Numerous hearings were held and statements made both in advocacy of and in opposition to the measures proposed. As a result of its deliberations, on April 21, 1902, the committee favorably reported to the house of representatives house bill No. 123, as follows:

"Be it enacted, etc., that on and after Jan. 1, 1904, all the departments of the government of the United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; and on and after Jan. 1, 1907, the weights and measures of the metric system shall be the legal standard weights and measures of and in the United States."

This bill was not considered by the house of representatives, but the fact that such a revolutionary measure, which so deeply affects the ship building interests of this country, received such favorable consideration from the house committee, warrants the bringing of the system to your attention today. It has been asserted that this bill does not make the use of the metric system compulsory, but this seems an evasion, for it is established after Jan. 1, 1907, as *the* legal standard weights and measures of and in the United States. It is the provision in all departments of the government of the United States, excepting the survey of public lands, the use of the system shall be compulsory, to which it is desired to call your attention. It is not necessary to remind this society how large a percentage of the ship building industry of this country is occupied in constructing government vessels, not only for the navy but for the war department, the revenue cutter service, the lighthouse service, etc., and all who deal with the government would perforce use this system in their work.

This naturally leads to the inquiry, what is the metric system, made compulsory by this bill? It does not appear that any statute enactment of the congress of the United States has determined this matter. A report to accompany a similar bill, No. 795, in the fifty-fourth congress, contains a review of congressional legislation on this subject, from which it appears "that a legal standard of weight has been established for use in the mint, but that beyond that, our weights and measures in ordinary use rest on custom only with indirect legislative recognition; that the metric weights and measures are made legal by direct legislative permission, and that standards of both systems have been equally furnished by the government to the several states; that the customary system has been adopted by the treasury department for use in the custom-houses, but that the same department by formal order has adopted the metric standards as the 'fundamental standards' from which the measures of the customary system shall be derived."

The act passed in 1866, authorizing the use of the metric system, did not define in terms of what those weights and measures consisted. Those interested will find the history and establishment of the metric system set forth in a work entitled "Le Systeme Metrique," by G. Bigourdan, Paris. It is there shown that the metric system was first adopted by law in France, Aug. 1, 1793. The necessity for its adoption arose principally from the confusion and lack of uniformity in the weights and measures in current use in different parts of the country. A committee of scientists had considered the unification of the systems, and after deliberations extending over several years had concluded to adopt as a new standard of length the one ten-millionth part of a quadrant of a meridian of the earth's surface. Pending definite determinations of the true length of this standard, a provisional meter was adopted by the law above referred to, and its use was made obligatory at the end of a year. The fundamental measures thus adopted included measures of length, of area and volume, of weight (or, more properly, mass) and of value. Owing to the difficulties in manufacture and in distribution, the new standards were not in use at the time decreed, and the first enactment was followed by another, dated April 7, 1795, making certain modifications in details, and adopting a nomenclature for the different weights and measures which is that in use today.

It can hardly be supposed that the committee on coinage, weights and measures of the United States house of representatives intended to use the franc as the measure of value in all government transactions, but it is one of the fundamental measures included by law in the French metric system, and would therefore seem to be included in house bill No. 123. In France, after its introduction, the metric system, outside of the unit of value, appears to have met with little success throughout the country and, though used in government work, it was not used by the people. A decree of Napoleon, dated Feb. 12, 1812, was an enactment by which the common measures of the country were derived from metric units. Matters remained in this state until the law of July 4, 1837, prohibiting all weights and measures other than those strictly metric after Jan. 1, 1840, being those originally enacted by the law of April 7, 1795, mentioned above. It will thus be observed that a period of over forty years elapsed between the first enactment of the metric system and the time its use became really current, and it has been shown in a paper on the metric system, read before the American Society of Mechanical Engineers last December by Mr. F. A. Halsey, that, even today, at the expiration of over 100 years from the date of its original adoption, the metric system is by no means strictly used in all commercial operations in France.

The fundamental object of any system of measures is uniformity and convenience in the daily transactions of life involving the use of measurements. Such measures include the following fundamental units: First. the group of dimensional measures, including lengths, areas and volumes; second, those of weight or mass; third, angular measures, in which may be included measurements of time; fourth, measures of temperature; fifth, measures of value. From these various units are obtained derived units used in scientific and engineering work, such as heat, work, electrical and magnetic units.

The fundamental unit having been established in any of these measures, the question arises as to the relations to be established of the unit to its multiples and subdivisions. The essential feature of the metric system is the adoption of decimal multiplication and subdivision. The committee of the French Academy of Sciences, originally appointed to consider a uniform system, reported on the matter Oct. 27, 1790. This report, as quoted in "Le Systeme Metrique" above mentioned, states that "without doubt the duodecimal scale would have some additional advantages, but this change of scale, added to all the others, would render its success almost impossible. We conclude, therefore, that the decimal scale should serve as the basis of all the divisions, and that even the success of the general working of the weights and measures depends, for a large part, upon that scale." There is here revealed a fundamental defect of the metric system. The Arabic system of notation (doubtless derived from the fact that there are ten fingers on the two hands) starts out with the radix ten, which contains but two factors—2 and 5—whereas the current necessities of daily life demand principally a binary division, with an occasional division into thirds. For this reason a radix of twelve, or a radix of eight, in the system of notation would be greatly preferable; but the logicians who ardently advocate the metric system generally admit that it is not possible to change the system of notation universally adopted by civilized people, and hence they put up with a scale of divisions which is in no sense convenient for current use in the daily affairs of life.

ARGUMENTS ADVANCED BY ADVOCATES OF THE SYSTEM.

The arguments advanced by the advocates of the metric system may be divided into two kinds—those which are theoretical and based upon logical considerations and those which are practical in character. Concerning the first, it may be remarked that it is now universally admitted that the meter is an arbitrary unit and differs appreciably from the one ten-millionth part of a quadrant of a meridian, and the kilogram differs by a very small but measurable quantity from the mass of a cubic decimeter of water at its maximum density. The logical argument for the use of the metric system arises principally from its conformity with the Arabic system of notation. But an appeal based upon logical and theoretical grounds should go farther back to reforms which, independent of expediency and practicability, are yet very desirable, such as a universal language, a system of arithmetical notation based upon a radix of twelve, and a universal unit of value. There are many who strenuously advocate such reforms, and it must be admitted that, were they practicable, they would be of great advantage in business and the affairs of life when everybody had gotten used to them. It is, however, just this question of transition that makes the difficulty in these reforms which, in the opinion of those who are not incorrigible enthusiasts, makes them utterly imprac-

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

ticable. If it be admitted that it is useless to attempt these reforms, the great value of which is undeniable, is it not impracticable to change over to the metric system, the value of which to us is, at least, questionable? The great majority of the metric advocates admit the impossibility of changing the system of arithmetical notation universally in use, and, therefore, demand the use of weights and measures adapted to that system. The arguments have centered about the dimensional and mass units to the neglect of units of value, angles, time and temperature. It seems to the writer, from a logical and metric point of view, they are equally important and worthy of reform. Astronomers and scientists, however, are still using the sexagesimal division of the degrees and hour into minutes and seconds, notwithstanding the fact that tables for computing in "grades" and centesimal divisions of it are in existence, and this for the very good reason that their historical records are written in the sexagesimal division, and to change would involve enormous labor entirely disproportionate to its utilitarian value. This reason does not apply to dimensional, mass or temperature units, and it was comparatively easy in the universality of scientific work to adopt those metric units, because there was no uniformity in scientific literature as to those units.

This brings us to the real reason for the adoption of metric units where they have been successfully introduced, and they are not logical or theoretical reasons, but practical ones derived from the necessity of uniformity and certainty in use. In France, where they originated, they gradually replaced heterogeneous and uncertain standards totally lacking in uniformity. Strongly advocated by scientists, not only on these but on logical grounds, they at first included a reform in the calendar, in the subdivisions of the year, of the day, of the quadrant, of temperature, etc. But of all of these, only those which had a real and evident utilitarian value to the French people remain in use. The same thing can be said of Germany and of other countries adopting the metric system in part at later dates. Uniformity of weights and measures did not exist, and the change (made with great difficulty and not today universal in the current affairs of life) is limited to those measures in which uniformity was essential. Those who desire to examine this subject further will find detailed information in the paper on the metric system by Mr. F. A. Halsey, already referred to.

Let us now turn to the practical reasons which have been advanced for the use of the metric system, usually limited by its advocates inferentially to units of dimensions and mass and their derived units with occasional reference to the centigrade division of temperature. These include arguments based on facility of use in every-day life, in greater rapidity of calculations, and convenience in the interchanges of international commerce. Before going further it seems well to inquire what constitutes "using" the metric or any other system of measures, in daily occupations, in manufactures or in commerce. It seems evident that it consists of using round numbers and a subdivision in conformity with the system of notation. When a French woman asks her grocer for a "demi-quart de livre" of something, she is not using the system in its essential essence, for this is 62½ grammes, or one-sixteenth of a kilogram; but she uses this division because it is convenient and responds to her desire for binary subdivision. In like manner, it is not using the metric system if we continue to use sizes of round iron, etc., which are round numbers in English measures and call them 25.4 millimeters, etc. We are not using the metric system when we superpose Whitworth threads on metric dimensions in our machine work. Nor would we be using the metric system if we continued the use of United States standard threads for bolts and pipes, but the metric advocates are forced to admit that they *must* be used during the "transitional period," whose length, in their minds, is usually inversely proportional to their enthusiasm. The transitional difficulties, after all that can be said to minimize them, are enormous. Outside of government officials, with our free form of government nobody can be penalized who does not choose to use the metric system in his business, except by refusing to give him a government contract, hence its general adoption must await the consensus of opinion at least of a majority, that it is a desirable change and worth in its ultimate results the great temporary inconvenience and monetary loss it would entail. The great success of this country in manufacturing work is due in large measure to standardization, and this standardization would be completely upset by the *real* as distinguished from the *pseudo* adoption of the metric system. The argument in this respect is tersely summed up in a letter from the Brown & Sharpe Co. to the house committee on coinage, weights and measures: "From an engineering point of view, the question of linear measures is irrevocably tied to the past."

THE MATTER AS IT AFFECTS THE SHIP BUILDING INDUSTRY.

It is not the writer's intention to enlarge on this subject in a general manner, but to call your attention to the matter as it affects the ship building and marine engine industry. There is first the question of screw threads, which, after all these years, has received no adequate solution in metric-using countries. There is the question of standard structural shapes, with enormous investment in rolls, which by no ingenuity can be crowded to fit into round metric dimensions. There are the tables of dimensions and all the literature of ship building. There are the data of past work embodied in innumerable records and plans which would become practically useless in their present shape. Finally, there are the mental concepts of dimensions, acquired gradually through life and familiar to all in the ship yard, from the trained architect and engineer to the humblest workman. These mental concepts are fundamental in carrying on work with ease and readiness, perhaps more so in ship building than in any other branch of manufacturing. The writer speaks from personal experience in stating that they are by no means easy to acquire, and it was only towards the end of four years' constant study and work in metric dimensions that he acquired any degree of mental readiness with metric measure concepts. In spite of all that is said to the contrary as to the ease of such acquirement by many who themselves have no such mental concepts, it is believed that the workmen, intelligent as many of them are, will pass many years, if not their whole lives, without acquiring it.

Let us now examine the practical arguments advanced as to the ultimate advantages of the metric system, which should induce us to go through the "transitional period" with its confusion and enormous cost. Let us first consider the supposed simplicity and adaptability of the metric measures. The personal experience of the writer is that they are lacking in flexibility. In ship building work there is a constant switching between the millimeter and the centimeter that is apt to be confusing; the units are either too small or too large; the convenience of binary subdivision is lacking. There is alleged against the English system the large number of subsidiary units. Let each ship builder here ask himself whether he has any use in his business for apothecary's weight, the troy pound, etc? Those measures are used by people in special occupations, who use them because they are convenient for their work and because they are tied to past history. Their existence or non-existence does not affect the ship builder one particle. His standards of length and weight are well established and uniform, and there is no uncertainty about them.

Let us now take up the question of ease in calculations. On this subject controversy has waged fast and furious. There is no manner of doubt that concrete examples can be fixed up to show the great superiority of either the English or metric measures according to the side taken by the controversialist. Here the practical identity between the kilogram and the cubic decimeter of distilled water is made to do yeoman's duty. This may be of some slight utility to the ship builders on the Great Lakes when we come to using the metric system in this country, but, unfortunately for the rest of us, we have to deal with salt water which has not this identity, nor has any other substance we have to deal with. So the matter reduces itself to using in one case multipliers derived from tables of specific gravities, and in the other from tables of weights per cubic foot or inch. Any one who wishes to use decimal subdivisions of English measures is at full liberty to do so, and, in fact, decimal subdivisions are very largely used in the United States by those who find it convenient for their business.

CONCLUSIONS FROM EXPERIENCE WITH BOTH SYSTEMS.

The writer has elsewhere made the statement, based on four years' work as a student of naval architecture and marine engineering in France, that, as far as the matter of ship building calculations is concerned, it is just as convenient to use English measurements as French, and sincerely believes it to be true. He deemed it desirable, however, to endeavor to obtain evidence from a native Frenchman on the subject. To that end he wrote to Mr. H. Capdevielle, who came to this country in adult years after acquiring his education as a naval architect in France, and who, since coming to this country, has been engaged in ship building work for over five years. He was asked to state his personal opinion on these questions of relative convenience in drawing work and convenience and rapidity of ship calculations. The following is his reply:

"In answer to your letter in regard to the use of the metric system, I might say that as far as the drawing-room work is concerned, the change to the metric system would affect it very little. It would improve the work in respect to all small calculations requiring transformation of quantities, and greater accuracy would be insured. I had some difficulty the first few months I started using the English system, and found it very tedious work, due to the numerous subdivisions of scales; but after becoming familiar with it, I think the facility with which these scales can be used is a great point in its favor. The adaptation of the English system to the progressive subdivision of quantities is a feature that the metric system does not have, and this is oftentimes very convenient. One part of the draughting work which would be greatly benefited by the use of the metric system is the preparation of armor plans. The calculation and figures to the nearest eighth of an inch is very awkward and necessitates the juggling of figures, which impairs the accuracy with which that work ought to be done. The inconvenience of transferring the decimal portions of an inch into the nearest eighth makes the figures given, most of the time, incomplete. It would be just as easy for the armor makers to measure with the metric system as with the English. I found, as far as the ship calculations themselves are concerned, that there is no material difference in the tediousness of the work, whether one or the other system is used. The advantage may lie with the metric system, as the use of constants and transformations is simplified, but that is a small matter. Generally speaking, a drawback to the English system is the necessity for the constant use for a hand-book. In engine designing, the metric system would make very little change, the dimensions in decimals being already in use to a great extent."

As the reference to armor plates seemed not quite clear,

Generated on 2024-08-27 15:56 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

further information was sought, and the following statement received:

"The part of armor to which I was referring specially is the turret. Most of the dimensions given for the outlining of it are deduced from the trigonometrical functions of angles, which are given in decimals, and when worked to the nearest eighth of an inch give very often incomplete figures. This is more evident in the last type of turret with the inclined top."

It may be remarked in this connection that formerly all armor plans were figured in thousandths of an inch, but the armor makers were unable to manufacture within limits anywhere approaching such accuracy, and a few years ago it was concluded to be more convenient on the whole for everybody to figure them to the nearest eighth of an inch. The great stimulus to international commerce has been advanced as an argument for the use of the metric system in this country. It may be at once admitted that, were there international standards of measurements, weight and value, and, further, were there an international language, it would be a convenience. It would reduce the number of clerks who have to be employed by those engaged in international commerce, especially those who are engaged in calculations of conversion from one unit of measurement and price to another, or in translating letters from one language to another.

It is, however, problematical whether it would be a serious advantage to the manufacturer for foreign trade as distinguished from the merchant, and more than doubtful whether the slight possible advantage is worth the cost of the change. Does anyone seriously believe we sell less wheat abroad because we use the much-contemned bushel in our domestic transactions?

In this connection a series of thirty questions was asked of the Societe des Ingenieurs Civils of France, which were discussed by the society in May last. Among the questions were inquiries as to whether the use of the bushel in the United States had any influence whatever on the importation of grains into France; the use of the gallon on petroleum, oils and other liquids, or the use of the pound on cotton, copper, etc. Similar inquiries were made as to machine tools, with the exception of fitting metric screw threads and verniers. Similar inquiries concerned the effect of the metric system on exportations from France to the United States, and the direct question was asked if it could be affirmed that commerce would increase between the countries by reason of the adoption by both of one system of measurement. The printed discussion shows not one word of reply to these questions.

To elucidate this matter with reference to our ship building interests, letters were written to certain ship builders inquiring what influence, if any, the non-use of the metric system has had on their foreign contracts. The following reply was received from the Wm. Cramp & Sons Ship & Engine Building Co.:

"In reply to your letter requesting information as to whether in any work we have taken for foreign governments we have met with any difficulties on account of insistence upon the use of the metric measures, we have to state that we have not used the metric system in any of the contracts awarded us. In some of the detail plans forwarded to us of ordnance and torpedo gear, the plans have been marked according to the metric system. These we have converted to feet and inches and have met with no difficulty in the matter. We have never failed to get a contract owing to our not using the metric system, nor has any objection been urged to the use of feet and inches."

The following reply was received from the Union Iron Works: "We used English feet and inches on all work on the cruiser which we built for the Japanese government. The gauges and thermometers were all marked metric and centigrade. The screw threads were all Whitworth standard. We have had no experience with customers wishing to force the metric system upon us. It is quite customary for us to use the decimal measurement of the inch, particularly in accurate work."

The bill quoted at the beginning of this paper did not pass congress, but its advocates are active and it is well understood that they propose to press legislation in the future. Its vagueness will doubtless be remedied in future bills and, supposing such a bill be adopted making the dimensional, weight and derived engineering units compulsory in government work, how will it affect your interests? In the beginning the navy department will perforce use a pseudo-metric system in which the round dimension sizes of the English system will be translated to the necessary degree of approximation in metric measures, the United States standard threads retained, the shapes rolled by steel makers given in approximate metric dimensions, making in all the worst hodge-podge that can be imagined. Workmen must be taught to think in metric units. Does it not clearly result from this that anyone who wishes to contract for government ships or other work will virtually be forced to confine his yard exclusively to such work or abandon it altogether? Will this not result in the government doing all its work in its own yards, with workmen specially trained? As the pseudo-metric system is gradually abandoned for the real metric system will it not result in the forced establishment by the government of a mass of subsidiary manufacturing establishments, such as rolling mills, machine tool works, etc.? There is one notable exception to the use of the metric system contained in the bill quoted, and that is the survey of the public lands. If the metric measurements are desirable in the United States, why make this exception? There *are* good reasons for the exception, the same good reasons as exist for the rejection of the whole bill. Are you willing to let the agitation for its adoption go on without making your sentiments known to the legislative authorities?

RESOLUTIONS OPPOSED TO THE METRIC SYSTEM BILL IN CONGRESS.

Of course it was to be expected that such a paper would provoke discussion and the expectation was not unfulfilled. Mr. McFarland announced that Mr. F. A. Halsey had given much thought to the subject and had now in preparation a book on the metric system. He begged him to present his views to the society. This Mr. Halsey did most forcibly and wittily. He said that it is a common assertion that the metric system is employed by two-thirds of the people of the world and that the only nations of importance which have not adopted it are Great Britain and the United States. It is commonly stated that 436,000,000 of people use the metric system.

"You cannot make truth out of untruth by merely repeating it," said Mr. Halsey. "No man, living or dead, ever saw the proof of these statements concerning the metric system. In point of fact they are not true and they must be regarded as simple assertions. Those who indorse the metric system go on the assumption that the change is needed. They maintain that a great many countries, namely forty-three, have made the metric system the legal system. As soon as the law is passed they assume that the people employ the system and therefore they reach the deduction that 436,000,000 of people are using it. In other words, they conveniently assume that their assertions are true. They do not take into consideration that the law simply makes the system permissive. It does not actually put it into operation. I have been at pains to investigate the actual conditions under which these so-called metric countries operate and I find that in thirty of them they employ the native system notwithstanding the legislative enactment. We have been told that Japan is metric. The United States consul at Tokio reports that the Japanese use their own native measures and this is corroborated by the Japanese consul-general. It is true that the navy of Japan has the metric system, but it imported its milometers with its ships. In the ordinary transactions of business the Japanese use native weights and measures. Even in their tariff schedule only nine items are classed by the metric system. Turkey, we are told, is metric too. They passed a law there once making the metric system the legal system of the country, but later repealed it when they found the people paid no attention to it whatever, but continued to compute in the old fashion."

Mr. McFarland interposed a bit of corroborative evidence, saying that he spent considerable time in Turkey while in the navy and found no sign of the metric system in actual use.

Mr. Halsey said that in his inquiry among the metric countries he had found that the system was not used at all in some of them, in others it was employed partly in governmental work, but in none was it universal. He found that in the Philippines the common weights were marked both in pounds and in meters, his correspondent unconsciously adding this bit of corroborative testimony: "Sometimes the metric system is required."

Mr. Halsey maintained that the metric system had never been followed by a people unless it was literally crammed down their throats by a policeman's club. He thought, indeed, that legislative enactment can never enforce it upon a people, for the reason that until goods are actually placed upon the market they are the property of a private individual and that a manufacturer will retain the inch measurement in his own factory. He pointed out the absurdity of selling lumber by the foot and billing it by the meter —a condition which actually exists in Cuba. After nearly a century of use France has lately again had to pass additional laws to make the people employ the metric system. He remarked that the agitation to adopt the metric system came from scientists only, whereas the opposition to it came from industry. It is one thing to merely change a scale of measurement, but it is another thing to actually change the manufactured product.

Mr. McFarland said that he had given some attention to the subject. He was at one time called upon to testify before the committee on weights and coinage at Washington, being apparently summoned by the committee as an advocate of the system. He, however, had to disabuse the mind of the committee on that score. He estimated that it would cost the Westinghouse company, with which he is connected, $500,000 to alter its standard fittings to suit the metric measurement and that it would entail an additional expense of $250,000 to alter their drawings.

Mr. W. D. Forbes said that Mr. Halsey had clearly proved that a state of positive chaos exists in the world today. He thought that Mr. Halsey's arguments would be good if it were true that the present inhabitants of the earth were going to live forever, but he thought that posterity ought to be taken into account, and that any movement which might be calculated to give to posterity a better system of weights and measures should be encouraged, holding, as it were, the moral obligation of the present generation to do what it could while it had life to promote the general progress of the world. He thought that, at least, the society should not seek to batter down the structure of the metric system until it had something better to offer in place of it.

Prof. Cecil H. Peabody said that the practical question was: Shall the ship building industry of the United States be made to carry the brunt of this change when it is probably the least able to support it? He thought that ship builders had at present upon their hands all that they could possibly contend with.

Mr. A. H. Sabin pointed out that while scientific houses might employ the metric system in any papers which they prepared they invariably issued their catalogues in the English system of weights

Generated on 2024-08-27 15:57 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

and measures. Even chemists, who have metrical apparatus, almost invariably use the non-metric system. Thermometers are computed on the centigrade scale which has no possible relation to the metric system.

Mr. Spencer Miller observed that as the society seemed to be practically unanimous on the subject it might be well to register its vote in opposition to the metric system. He thereupon made it as a motion that the society protest against the passage of the bill which has lately been offered in congress to introduce the metric system in government work.

At this point Mr. Hyde of Bath, Me., announced that he had prepared resolutions to that effect and Mr. Miller accordingly made his motion as a second to the resolutions.

Mr. Forbes did not desire to be recorded as endorsing any such action and desired a call of the roll. After Mr. McFarland had suggested a ballot by letter, to which no second was received, a vote was taken resulting in the adoption of the resolutions—forty ayes to eleven nays.

Naval Constructor Linnard in concluding the discussion said that, granting a slight advantage which the system might possess over the present method, he did not think it sufficient to warrant the enormous expense and confusion which would result from the change.

ELECTRICITY IN MANUFACTURING PLANTS.

Again this year Mr. W. M. McFarland, who was until a short time ago in the front rank among engineers of the navy and who is now with the Westinghouse company, presented a paper to the society. He has been an earnest worker for the success of the society, from the beginning. Mr. McFarland's paper dealt with electric drive in ship yards and contained illustrations of some of the principal tools of leading American ship yards that are electrically driven. The paper follows:

Ten years ago a distinguished member of this society read a paper at the Engineering Congress in Chicago, entitled "The Planning and Equipment of Modern Ship and Engine Building Plants," in which he discussed very thoroughly the subject of motive power and the methods of power transmission. The paper was an exhaustive one, and gave a very complete and satisfactory comparison of the various methods of the application of power in large manufacturing areas such as a ship yard or engine building plant. At that time, although electricity had been used for power transmission to an extent sufficiently great to justify our colleague in devoting several pages of his paper to a discussion of its advantages and disadvantages, he did not reach the conclusion that, all things considered, the electric drive was the best. He said: "While there is certainly some combination which would result in the best all-round efficiency as a ship producing plant, yet it is equally true that we have not sufficient data on which to form exact ideas of what such combination for any given case should be."

At the present time there can be little doubt that the question as to the best system of power transmission has been definitely settled in favor of electricity, and the quotation from this admirable paper has been given to show how rapid the strides of progress have been. Indeed, when the latest of our large ship building plants was equipped some six years after the date of the paper above referred to the decision was in favor of the electric drive. So great are the advantages of electricity that not only is it used in preference to older methods in the case of new plants, where a decision as to the best method has to be made, but progressive managers are taking out older methods of power transmission and superseding them by electricity. In the past few years such well known and long-established British firms as Harland & Wolff and Palmer's Ship Building & Iron Co. have equipped their works electrically throughout.

At the risk of taking up your time unnecessarily with an aspect of the case with which you are all familiar, we may consider very briefly the older methods of power transmission and their disadvantages, and contrast these with the advantages offered by the electric drive. Speaking broadly, the system of power transmission in almost universal use until five or six years ago was with the steam engine as a prime mover, driving a series of main shafts which, in turn, by means of counter-shafts and belts, drove the individual tools. This, of course, was the case for a single shop of reasonable dimensions. In the case of an establishment covering a wide area, such as a ship yard or a very large manufacturing plant, the system was either a central boiler plant transmitting steam to engines located in different parts of the manufacturing area, or, sometimes, in very large works, a number of boiler plants with some engines near them and others at a considerable distance.

Compressed air was used to an extent greater, perhaps, than ordinarily supposed, although it was never in common use for transmitting power. It is interesting to note that there were extensive installations at the Cockerill Works, Seraing, Belgium, and at the Terni Steel Works in Italy. In a number of our New England cotton mills, where there was a surplus of water power, compressed air was used for transmission to places which could not conveniently be reached by belt or rope drive. The Dominion Cotton Mills, Canada, were originally driven entirely by compressed air. It is generally known that the Popp system of compressed air transmission was used in Paris on quite a large scale, several air-motor stations of considerable size being installed in connection with electric lighting. Nevertheless, the use of compressed air was by no means general in industrial establishments for power purposes. At the present time compressed air is largely used in modern manufacturing for the operation of pneumatic drills, hammers, chisels, calking tools and the like, but not for driving large power tools. Hydraulic transmission is used to a limited extent for certain special tools such as large riveters and flanging machines, but from its nature it is not well suited for tools having a rapid motion, either rectilinear or circular, and although there have been a few large installations, they have been very rare.

The disadvantage of long lines of shafting was thoroughly realized before electricity offered such a simple solution of the difficulty. Unless the greatest care was used in keeping the shafting in alignment and the journals well oiled, the power wasted in the friction of bearings and belts was a very large percentage of the total power of the engine. The results of numerous experiments to determine these losses have been published repeatedly, and show that they have varied from 8 or 9 to 80 per cent. of the power of the engine. That there should have been even the minimum loss when all the tools were in operation was bad enough, but unfortunately, from the nature of things, this loss was going on all the time, even when only a few tools were in operation, as it was practically constant and independent of the load. A preliminary solution of this difficulty was to divide the shafting into short lengths, driving groups of tools and operating each group by a small steam engine, but this introduced the lower efficiency of small engines and the complication of long lines of steam piping with the inevitable losses due to condensation. There was also involved additional supervision, as each engine would generally require a considerable part of the time of a man to look after it. With the case of a very large establishment with numerous power plants scattered over its area, the conditions were still worse for economy, as it was practically impossible to have the best skill at each one of these little plants, and, as a rule, they themselves were not economical.

When we compare the conditions obtaining with electric transmission, the contrast is very great. Instead of the long lines of steam piping with their attendant condensation and heating of the spaces through which they pass, we have the small flexible wires conveying current, which can go anywhere and as a rule are located in spaces not useful for other purposes. Both generators and motors have a high efficiency and, speaking generally, the part of the apparatus requiring skilled attention is almost entirely concentrated in the power plant. There are no losses from condensation, and the analogous loss, that due to the heating of the wires consequent upon transmitting the current, is, for the distances common in industrial establishments, so small as to be a matter of little moment. The electric motors lend themselves readily to small subdivisions of power, the efficiency of small motors being only a little less than that of large ones as contrasted with the enormous reduction in economy of small steam engines. In consequence it is practicable to use the motors, either for individual tools or for groups of tools. In either case. there is no loss comparable to that of driving the long lines of shafting and belting to operate a few tools, and power is only supplied in proportion to the actual call for it, for even in the case of group driving the groups would be relatively small and of such a nature that it would rarely be the case that a whole group would have to be driven to give power to a single tool.

FIRST APPLICATION IN MANUFACTURING LINES.

The first application of electricity in manufacturing plants was for illumination, and this today is, of course, universal. The next application was for traveling cranes, and these were described in the paper of Professor Durand, which was referred to at the beginning. At the present time the traveling crane is really the most indispensable power tool in the large machine shop, and it is no exaggeration to say that the great plants of today would be impossible without the electric crane. The form in almost universal use is that having three motors to give the necessary motion in three directions. The ordinary traveling crane is so well known that it seems hardly necessary to refer to it. I would direct attention, however, to cranes operated with alternating current motors, for the reason that the great majority of cranes in ordinary use are fitted with direct current motors, and it is probably the idea of most people that the induction motor, which is so admirably adapted for most uses in manufacturing establishments, is not adapted to crane service. The complete answer to this is that a number of cranes operated with alternating current motors have been used for a long time in one of the Westinghouse foundries, and the new foundries which have just been equipped at Trafford, about fifteen miles from Pittsburg, are fitted with these cranes throughout. Anyone at all familiar with the very exacting service required of foundry cranes will realize that if they give satisfaction in this work they will be satisfactory everywhere. Several large gantry cranes at the works of the New York Ship Building Co. are driven by direct current motors. It is interesting to note in connection with these cranes that electromagnets used with them for lifting plates and other structural material reduces hand labor to a minimum. They enable valuable space to be utilized in a way that would be impossible if the material could only be moved by hand. Most of the members of the society have visited this plant and have seen these cranes in operation and can appreciate this point.

After their introduction for crane service, it is probable that electric motors were next used in small sizes and in relatively unimportant places; but without further attempting to

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

trace their gradual introduction, it may be said that today there is scarcely any field which was formerly filled by a steam engine or by a belt transmission that cannot be filled by motors. In saying this there is no reservation as to localities where there is an absence of dirt or heat, for just as they have displaced steam engines and belt driving in machine shops and similar locations, so they have displaced them in rolling mills, cement works and the like, where the work is either exceedingly severe or where the motors must run in a heated and dirt-laden atmosphere. Motors have been used for a long time in the steel mills for adjusting the roll trains, for operating the Wellman charging machines and the elevators at blast furnaces, but within the last few years a number of cases might be cited where motors are used to drive the roll trains themselves—an exceedingly arduous task.

HOW FAR SHALL INDIVIDUAL DRIVE BE CARRIED.

There being no longer any question as to the method of power transmission to be used in a projected plant or in modernizing an old one, there are, however, two questions which confront the manager in making his plans—first, how far shall individual driving be carried, and, second, shall alternating or direct current be used? To neither of these questions can an answer be given which will receive universal approval, but we may consider each case to see what claims are made. Considered alone and for the individual tool, the individual drive is ideal. It enables the power to be applied just when wanted and only when wanted, and further enables each tool to be used under conditions of maximum efficiency. The objection will occur at once, however, to any practical man, that the enormous multiplication of small motors means increased complication and greatly increased cost. For example, the cost of a 10-H. P. motor is very far from being ten times the cost of a 1-H. P., and although, as stated above, the efficiency of small motors does not fall below that of large ones to any such extent as the difference between small and large steam engines, nevertheless there is a material difference. Some engineers go so far as to say that they would have a motor for each tool, even if it involved going to sizes as small as ¼ H. P., but the writer is inclined to believe that the judgment of more conservative engineers is favorable to individual driving where the power required will be, say, from 5 to 10 H. P. and upwards, and for group driving where the individual tools would require less than those amounts. In any large plant there are numerous small tools, such as drill presses, screw-cutting machines, light lathes, etc., which are in any case located together, and where it is perfectly easy to drive them as a group. The average power required for such a group will be quite uniform, and when they are group-driven a moderate-sized motor, with its relatively high efficiency, can be used with a fairly-steady load, thus contributing to the efficiency of the general system, as well as of the particular group, and materially reducing the first cost of the installation. Where an excessive number of motors is installed, particularly if they are of the direct current type, it will involve a material increase in the attendance necessary to maintain them in an efficient condition.

One case where individual driving is obviously a necessity is in the case of portable tools, and the electric drive has made it possible to use portable tools on a scale that was previously unthought of. As the individual parts of machinery have increased in size in recent years, there has been more and more a tendency to take the tool to the work rather than the work to the tool. Indeed, in many cases careful investigation has shown that the time spent in setting these large pieces of work ready for the different tools to operate upon them was actually longer than the time occupied in useful work. In several large establishments in our country, including the one with which the writer is connected (and the latter, it is believed, has the largest example at present), a section of the largest erecting bay has a floor which is a huge bed-plate, practically the same as the table of a planer very much enlarged. This is carefully leveled and supported on massive concrete foundations. The portable tools, slotters, boring mills and milling machines are made with heavy frames having large flat bases made perfectly true. The result is that the tools will work either exactly perpendicular or exactly at right angles to the floor plate. In the Westinghouse works, however, as an application of the most advanced system of laying out work, a special form of surveyor's transit is used, and it is determined when the tool is brought up to the work whether it is in absolutely correct alignment or not, and if it is found at all out it is easily adjusted by wedges. One of the largest of these tools weighs 25 tons, a figure which would have been considered a very respectable stationary tool ten years ago. In some cases the motor can be readily stowed inside the frame of the tool, and in others it is attached outside.

In ship yard tools, as distinguished from those in machine shops, individual driving would, of course, almost always be preferable. Attention is directed in this connection to such ship yard tools now in use as a set of vertical plate-bending rolls driven by two 50-H. P. induction motors; a 100-ton punch; a cold saw driven by two motors; a very interesting case of a boiler shell-drilling machine at the works of the New York Ship Building Co., etc., etc. The adaptability of electric motors to boiler shell drilling gives a very much more useful tool than the methods which had previously been generally used. These, as a rule, had the shell horizontal, and used not more than three tools, each with a single drill. Each one of the three tools used in this case drives four drills.

RELATIVE MERITS OF ALTERNATING AND DIRECT CURRENT.

When we consider the relative merits of alternating and direct current for motor driving, a subject is opened on which there is and has been a great deal of controversy, and it is far from the writer's desire to precipitate a lengthy discussion which in the end would be almost entirely the expression of opinions and could settle nothing. It will be understood, therefore, that the views advanced are largely his own opinions, based upon a somewhat wide experience of the classes of motors that have been applied in numerous installations, and also as representing a concern which makes both kinds of apparatus in large quantities. It is the writer's opinion that if the induction motor had been the first to enter the field there probably would have been no room for argument, because its merits are so great that there would have been little incentive to develop anything else. It happened, however, that although alternating current was the first, as it is the natural product of any machine without special commutating devices, it was some time before a commercially practicable alternating current motor appeared, and the direct current motor, being first in the field and being undoubtedly meritorious, acquired the vogue which always comes to that with which people are familiar. Mechanically the induction motor appeals at once to every practical man as the better device. The coils of wire are entirely stationary, while the rotating part consists of discs of sheet steel enclosed by massive composition end rings, which latter are connected by stout bars of copper bedded in slots in the steel sheets. The direct current motor, on the contrary, has its coils movable as well as stationary, and, while these do not often give trouble, they are not so simple and mechanical as the rotating part of an induction motor. The direct current motor has an additional feature which is entirely absent in the alternating current motor, the commutator and brush holder. These are the parts requiring most attention and the ones most liable to give trouble, although the modern methods of design and manufacture have reduced this to a minimum. The induction motor is about as simple as a grindstone or a pulley, because, as already stated, the rotating part is exceedingly strong and mechanical and it has no connection, either electrical or mechanical, with the stationary part, except in the bearings, and as long as these are kept properly oiled there is no chance for trouble. The absence of a commutator does away with all danger of sparking, and hence renders it peculiarly adapted for use in such places as carpenter shops, powder mills and other places where sparking is absolutely inadmissible.

A very natural inquiry may at once arise from those not familiar with the subject, as to whether this great simplicity of the induction motor is not accompanied by a low efficiency. So far from this being the case, the efficiency of the induction motor is fully equal to that of the direct current motor, and indeed is slightly better over most of the range of its capacity. Thus far it might seem that everything is so greatly in favor of the induction motor that there could be no room for choice; but the type here referred to has, from some points of view, one defect, namely, it is a constant speed motor, and many of the foremost advocates of individual tool driving want a motor whose speed can be varied through a wide range. From this point of view the direct current motor is superior, but the extent of the superiority depends almost entirely on the degree of importance which is attributed to securing variable speed from the motor itself without the intervention of belting or other mechanical means of varying the speed. It is entirely possible to make an induction motor whose speed can be varied. (Here attention is directed to illustrations of two types of variable speed induction motors). It will be noted, however, that in both of these the extreme simplicity of the first type is lost on account of the slip rings, which are used to enable the variable speed to be obtained by throwing resistance into the circuit. These, of course, while exceedingly simple and not so complicated or liable to derangement as the commutator of a direct current machine, do add a slight additional complication. Before going on to explain some of the different methods by which variable speed is obtained with direct current motors, it may be mentioned that in the New York Ship Building Co.'s works and also in the steam engineering plant at the Brooklyn navy yard the simplest type of induction motor is used, and the variable speed is obtained by means of belts and cone pulleys. In the opinion of the writer this method is entirely satisfactory and gives an adequate range of speeds with extreme simplicity.

It may be well to mention, in speaking of direct current motors, that apart from crane service, the type of motor almost universally used in industrial plants is the shunt motor, so called because the field circuit is a shunt from that of the armature. The shunt motor is inherently self-regulating, and within moderate limits the speed remains constant without regard to the load coming upon it. One of the simplest methods of varying the speed is by varying the field strength, which can be done by introducing a suitable rheostat in the field circuit, and as only a small proportion of the current goes through this circuit anyhow, the loss is immaterial. The speed can also be varied by introducing resistance in the armature circuit to cut down the E. M. F. acting upon the armature, but this is objectionable on account of the large amount of energy wasted as heat in the resistance. Another method which has been used with decided success and simplicity is the three-wire system from a single generator in connection with field regulation, which enables the speed of the

Generated on 2024-08-27 16:05 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

motor to be varied sufficiently to meet all practical purposes. The three-wire system is obtained by utilizing a special generator somewhat resembling a rotary converter; that is, in addition to the brushes and commutator furnishing direct current, leads are brought out from the armature winding to two or more slip rings placed upon the armature shaft. From these slip rings alternating current is taken, and if this is passed through an auto-transformer, and a lead is tapped from the middle of the transformer coil, this lead will always have a potential midway between that of the terminals on the direct side of the machine, thus securing at the motor two voltages, one equal to twice the other. By field regulation the speed can be varied through a ratio of about one to three, so that with this variation combined with the two voltages of the three-wire system we get a range of six speeds, which, in general, will be amply sufficient. Another system, known as the multi-voltage system, has also been used to some extent with direct current motors, consisting of a number of circuits working at different voltages. Suppose that, commencing with a negative wire, the voltage rises to 60 at the second wire, 140 at the third, and 250 at the fourth, thus giving intervals of 60, 80 and 110 volts. It is obvious that we can get any of the three voltages by the intervals, and by varying the wires we can get in all six voltages. If the field of the motor is constantly excited at, say, 250 volts, the several voltages applied to the armature will give as many different speeds, and the gaps between may be filled in by slightly varying the field excitation. The objection to this system is the complication of the generating apparatus and of the wiring. Still another system is that called after the name of its inventor, the Ward-Leonard system, which depends upon supplying a current of varying voltage to the motor by varying the field strength of the generator, the field of the motor being constantly excited from an independent constant potential circuit. This is the system employed for turret turning on board naval vessels, where it has worked very successfully, and it was described in detail some years ago in a paper before the society, so that we need not go into it further here. It will be seen that the objection to this system is its enormous complication when attempting to apply it to so large a number of motors as would be found in a manufacturing establishment.

In the comparison of the two general classes of motors, one of the special advantages of the induction motor was not mentioned, namely, that from its construction there is no danger from a short circuit, because the bars in the rotating part are purposely short-circuited. Further, this motor will stand being brought to a full stop for a moment with the full current upon it without any resulting damage, while such an occurrence with a direct-current motor would certainly burn out the insulation, if not doing still greater damage. As a result of this it is not necessary to fit circuit breakers or fuses to take care of these motors. In the small sizes the motor can be started up by simply closing the circuit by means of an ordinary switch, and in the larger sizes practically the same thing is done, as a two-throw switch is used in connection with an auto-starter, which is simply a small transformer arranged to give half the line voltage in starting up, the object being not so much the protection of the motor itself as to avoid the demand for a large amount of current from the generating system, as the starting current without the transformer would be somewhat more than twice full-load current. In the case of the direct-current motor it is, of course, necessary to start through the rheostat, so that the full voltage only comes on when the motor is up to speed.

COST OF ELECTRIC DRIVE COMPARED WITH OTHER METHODS.

A feature of great interest in connection with the use of electricity is its cost as compared with that of older methods. Before giving some figures of a careful test which was made of the two systems, it may be remarked that in a thoroughly efficient plant it is probable that the cost of power rarely exceeds from 5 per cent. to 10 per cent. of the total cost of the product, so that it is obvious that even a very large percentage of saving in the cost of power will not reduce the total cost of the product very materially. Nevertheless, in a very large plant the saving would be quite respectable. The truth is that while the electrical system of transmission does secure a material reduction in the cost of power, this, after all, is not its greatest recommendation. The greatest benefit comes from the elasticity of the plant consequent upon its use. There is no longer any necessity for the rigidity of arrangement which obtains with shafting and belting, so that if it becomes necessary to rearrange the plant at any time the expense is reduced to a minimum. In the New York Ship Building Co.'s plant, for example, many of the tools being absolutely self-contained were not secured to foundations at all, and could be moved to any position desired, although these tools are not of the kind ordinarily considered as portable. The use of individual motors, and the consequent reduction in the amount of shafting and belting employed, makes the shops very much lighter, and gives overhead freedom for crane service with attendant increase in economy of production due to the greater efficiency of the employees working in better light.

Data have already been published showing the economy resulting from the substitution of electric driving for older methods in plants which have been long established, but the one which I shall give is a very interesting example, because the system superseded was probably as well adapted to the circumstances as any installation not electrical. The Westinghouse Air Brake Works at Wilmerding, Pa., consist of a number of large detached buildings, and their old system of power transmission was from a separate boiler plant to individual small engines scattered about the various shops. Nearly five years ago they decided to install an electric drive consisting of alternating current generators driven by Westinghouse-Parsons steam turbines, supplying induction motors. There were originally a number of small steam engines which drove the tools on the group system, the engines being connected to moderate lengths of shafting. When the motors were introduced the number of groups was nearly doubled, this of itself being a decided improvement. The same boilers were used for the tests, which consisted of first running the shops several days and nights with the engines, and then for several days and nights with the motors. Both coal and water were carefully measured, and the saving as a result of the electric drive is about 32.5 per cent. It must be understood, of course, that it is not claimed that any such saving as this could be counted on in cases where the plant is relatively small and so disposed as to permit of the use of a very economical power plant driving well-designed and well-cared-for shafting. The actual saving in coal per day of twenty-four hours was about 40,000 lbs., or 20 short tons. With coal at the price which obtains in the Pittsburg district of less than $2 per ton, this does not represent a very large sum of money, but it will readily be seen that where coal costs $3 or $4 a ton it would mean a very respectable figure. The saving, however, did have a very marked effect from the fact that with the engines the capacity of the boiler plant had been about reached. As will be noted from the figures quoted, the reduction in steam consumption was about 30 per cent., which, of course, left a large reserve power in the boilers.

There are a number of other interesting points in connection with the use of electricity which might be mentioned, but they appeal rather to the electrical engineer than to the average member of our society, such as the most suitable number of alternations to be used if alternating current is adopted. In this matter a good deal depends on the extent of the plant and whether the lighting circuits are to be the same as the power circuits or not. For many reasons 3,000 alternations is the most suitable one for driving motors, but this is too low to give satisfactory service with arc lights, and also rather low for incandescent lamps. In such a case it may be desirable either to use an independent generator at 7,200 alternations, or perhaps a motor generator set, or even to make the exciters for the main generators large enough to use direct current for lighting. Again, it may be decided to use alternating current for power tools and direct current for cranes, in which case direct current may be obtained either from a rotary converter or from a "double ended" generator. This last was the method used at the New York Ship Building Co.'s plant and furnished an excellent solution. The beauty of this apparatus is that the current divides automatically to answer the demands upon it so long as the combined amount of alternating current and direct current does not exceed the capacity of the machine.

Another useful application of electricity, if the plant is large enough, is the electric locomotive, which can be operated by either the overhead trolley or the storage battery, or what is known as the "button system." This last does away entirely with live wires which can cause any injury, the so-called "buttons" only being alive when the locomotive is over them.

To sum up, we may say that by the use of electricity for power transmission we secure an enormous increase in the flexibility of design of the plant, being able to locate the power plant itself and the various shops where the circumstances of the case require them for efficiency, the lines for transmission being so small as to make moderate variation of length unimportant. We also secure a marked economy in the cost of power, a greater efficiency in the machine tools themselves, and a greatly-increased efficiency of the personnel, due to the increased habitability and cheerfulness of the shops.

In discussing Mr. McFarland's paper Mr. R. L. Newman said that Prof. Charles H. Benjamin of Case School of Applied Science at Cleveland had told him that he had calculated that electrically-driven machinery resulted in a saving of over 50 per cent. as against belt-driven machinery. Mr. Newman himself said that he thought the saving in a modern ship yard might be as high as 75 per cent. Concerning the electric magnets in the yard of the New York Ship Building Co., he believed the magnet to be an appliance which could be used to advantage but thought it rather an expensive tool.

DESCRIPTION OF BIG HILL STEAMERS FOR PACIFIC SERVICE.

Mr. Charles R. Hanscom, president of the Eastern Ship Building Co., New London, Conn., had prepared a paper entitled "Description of the Design and Building of the 21,000-ton steamships Minnesota and Dakota" which was, in his absence, read by Mr. A. MacN. Main, who is connected with the yard at New London. Mr. Hanscom described how the ships were started before there was any yard in which to build them and how both yard and ships had grown together. His paper was a complete description of the methods employed in building the ships and of the ships themselves.

This paper elicited considerable discussion. Mr. R. L. Newman ventured the remark that Mr. George Stanbury, head surveyor for Lloyds in the United States, had much to do with designing the vessels and suggested that the chair call upon Mr. Stanbury to discuss the paper. The first thing Mr. Stanbury did was to correct the impression conveyed by Mr. Newman that he had had anything to do with designing the ships. He said he had not, but that he had had considerable to do in the arrangement of the scantlings and the details concerning them. He said that he

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

had watched the building of the ships from the beginning and believed it to be the most unique occurrence in the history of ship building. At any rate in his personal experience he had never seen anything quite the same.

Mr. Newman remarked that the practice of building the ship from the middle body to the ends (a point brought out in Mr. Hanscom's paper) was a common one on the lakes, possessing the advantage of employing a greater number of men at one time. He also thought that the New York Ship Building Co. deserved credit for designing and building two large ships—the Mongolia and Manchuria.

Mr. J. V. Patterson, naval architect for the International Mercantile Marine Co., said that Mr. Hanscom's paper was exceedingly interesting but that its title was misleading. He had expected from it that the design of the vessels would be gone into but there was little expressly stated on that subject. He also noted other omissions, such as displacement and weight. He added that he thought that that man was a very vain man, indeed, who claimed originality in steamship construction these days. He pointed out that certain features had been worked out in the New York and Paris ten years ago by Prof. Biles and were the result of costly experiments conducted at Cramps. He regarded Prof. Biles as a man of great courage and originality, adding that it was to be expected that existing knowledge of steamship construction should be utilized by anyone, but that credit should be bestowed where it belongs. He did not desire to minimize the energy and ability displayed by Mr. Hanscom in building the ships. He agreed with him that an expensive ship yard was not necessary to build even the finest ship and expressed the hope that Mr. Hanscom's achievement might serve as an object lesson to the investing public, declaring that the only justification for an enormous outlay of capital on the yard itself would be a perpetual assurance of orders.

WORK OF EXPERIMENTAL TANK AT WASHINGTON.

In the absence of Naval Constructor D. W. Taylor, his paper upon "Ships' Forms Derived by Formulae" was read by Naval Constructor Linnard who interpreted it excellently. This paper was primarily a description of methods developed in practice at the experimental model basin in Washington for the purpose of determining quickly the lines of models possessing desired characteristics. Formulae are given for calculating water lines or sections of ships possessing within limits wide optional variations of shape. The formulae and methods set forth require careful study to be fully understood. It appears that at the model basin lines drawn more or less by trial and error, the usual method, are called "hand made," while those obtained mostly from the formulae have been christened "machine made." An interesting portion of the paper consists in the description of the competition between "machine made" and "hand made" models, five in all, in determining the lines of the 13,000-ton battleships Idaho and Mississippi. It is mentioned in the paper also that these five models were not all that were tried before the final selection of shape for the battleships. The concluding paragraph of the paper, quoted below, shows the practical results gained by thorough and scientific investigations in advance:

"There are five battleships in the navy of 11,500 tons displacement and but 7 ft. shorter than the Idaho class, which averaged on trial almost exactly 17 knots with 12,000 I. H. P. For the Idaho design of 13,000 tons we anticipate 17 knots with but 10,000 I. H. P., and if on trial they show the efficiency of propulsion obtained by the later battleships of the 11,500-ton class, the speed of 17 knots will be appreciably exceeded. This result can be ascribed only to the facilities for investigation which the experimental model basin affords the bureau of construction and repair. Without these facilities we would not have known how to improve upon model B which showed over 16 per cent. more resistance than the model finally adopted."

Referring to Mr. Taylor's paper Prof. William Hovgaard said:

"Even with the marked increase in the number of experimental tanks, we are only at the threshold of the problem of how best to design a ship for a given speed and given service. We know in a general way what we do but we are rarely sure as to whether we might not so modify our design as to gain as much as 10 or 20 per cent. in resistance. The problem is one of extreme perplexity and like most other scientific problems can only be solved through long series of experiments—series of series, in fact. Only when such data are available in a continuous and complete way will it be possible to draw general conclusions or to tabulate results so that an answer may be had to reasonable questions occurring in the design of lines of a ship. One experimental tank can do only a small part of the work that is to be done in this line. Nearly all the tanks are built and run, as far as resistance is concerned, chiefly for the purpose of determining the best form for any concrete case, whether a war ship or a merchant vessel, without much regard to combining the results so found with others, the ultimate purpose being not to produce results of value to science but results of either military or commercial value. This is unfortunate, as the results of science are not a secret; they are made the property of everybody; they may be combined with results of research in other countries and may thus be used by everybody in promoting commerce and industry. Take, for instance, this matter of resistance. An accurate general knowledge of how to design ships would undoubtedly result in a saving of millions—not to any one nation or to individuals but to the whole world. Unfortunately the general principles on which the tanks are now operated are antagonistic to this real scientific research. Results of tank work published thus far are rarely complete and not of much value from a general standpoint. From the tank at Washington more data has perhaps been given out than from most others. As long as the work is done in a spasmodic way and results kept secret we can not hope for much progress in this science. It would certainly seem possible to devote a small part of the work of all the tanks to research that could be published; to co-operate and distribute this work in the different countries, as is done in the case of astronomical observations. Probably we may hope that we will some day have experimental tanks built chiefly for general scientific research. There is, however, another condition for making such work fruitful and that is the existence of some means of characterizing the lines of a ship in a concise manner, for only in this way is it possible to determine and classify the enormous work to be done. It is in this regard that the formulae given by Naval Constructor Taylor will prove useful. It appears possible by this formulae to express in a simple and concise manner the form of the immersed portion of a ship. Certain constants or parameters enter into the equations of the lines, and experiments may now be based on a given set of fixed parameters, giving only one of them a number of different values. In this way it will be possible to do the work in a constant, continuous manner, but as I understand, the work of many tanks and many years will be required before this problem is exhaustively dealt with, and besides the question of hull resistance there are a number of other problems connected with ship design which await solution through tank experiments. We should therefore welcome this, the first attempt, successful so it appears, of presenting the form of ships in a mathematical way."

Mr. J. C. Kafer hoped that Mr. Taylor might examine the two old vessels Wampanoag and Kansas City. The Wampanoag is now the Florida. She is a wooden vessel, built in 1865, and has made 17 knots at 4,000 H. P. The Kansas City is still running in the Savannah service of the Ocean Steamship Co. and has made 17½ knots on 3,500 H. P. For displacement and power he did not believe that these performances had ever been equaled and he thought that probably Mr. Taylor might be able to add something of genuine value to his researches by examining them.

Mr. George Crouse Cook made inquiry as to the expense to the ship builder or ship owner in cases where the bureau of construction and repair undertakes at the Washington basin trials of models of vessels other than those of the government. Mr. Linnard replying for Mr. Taylor, said that a large number of ship builders had already taken advantage of the government rule that permits of assistance being given to the vessel interests in this regard. The bureau officials have, however, kept the tank going nights and Sundays on government work almost since its completion, and therefore take only such outside work as will recommend itself on merit. The builder must prepare the lines of the ship and make a deposit of $500. The government makes the model and provides all else that is necessary to carry out the trials, furnishing the curve of effective horse power and ending with that. The charge is the actual cost of the trials without reference to the great sum of money invested in the tank and its appliances. Col. Stevens said that for two models and their trials he paid only $350.

Adjournment was then taken for lunch.

CLOSING SESSION.

At the opening of Friday afternoon's session resolutions of condolence were, at the suggestion of Mr. Lewis Nixon, ordered to be prepared and sent to the families of the following members who had died during the year: Chief Engineer D. P. Jones, United States navy; Henry G. Morse, George Pierce, Irving M. Scott, Henry Steers and Prof. R. H. Thurston.

The first paper to be read was "Displacement and Stability Calculations," by Prof. W. S. Leland of the Massachusetts Institute of Technology. This paper, which is both interesting and important, will be published in the next issue of the Review.

Mr. M. S. Chace, president of the Crescent Ship Yard Co., had prepared a paper upon "Notes on the Launching of the Cruiser Chattanooga," which was read by Assistant Naval Constructor S. F. Smith. In this paper Mr. Chace gives to the society valuable information regarding the use of a mask for checking, during launching, the speed of the cruiser Chattanooga, 3,200 tons displacement, launched at the Crescent ship yard, Elizabethport, N. J., in March last. In launching the Chattanooga the problem which presented itself was to stop the ship without shock, once afloat before she had moved in the line of the launching ways more than 283 ft; the width of the Staten Island sound opposite the ship yard, from the end of the launching ways to the limit of the water deep enough to float the Chattanooga being 575 ft., this vessel having a length on the load water line of 292 ft. The narrowness of the sound, together with the fact that the keel was laid at an angle of about 75° with the shore line towards the incoming tide, made it impracticable to attempt to swing the ship around with the tide by the use of stern anchors or spring lines, assisted by tug-boats, as is generally done in launchings from these works. The tide falls nearly 2 ft. (mean rise and fall is 5 ft. 4 in.) before the direction of the current changes, so that it is necessary to launch while the tide is running in quite strongly in order to have sufficient depth of water over the end of the groundways, making it impossible to wait for the change in direction of the flow of tide and then to swing the ship with the ebbing tide. The method employed to check and stop the ship consisted in the use of a mask secured to the stern at the after edge of the rudder, together with a series of rope stops on each side of the ship connecting at intervals two bow chains with two fixed ground chains laid outside of the groundways and parallel to

Generated on 2024-08-27 15:58 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

them; the stops being arranged to break in succession, starting as soon as the ship was afloat, with the stem clear of the groundways, the bow chains then being taut.

This method is frequently used in the government and private ship yards of France. Outside of France the use of a mask for checking the speed of a ship during her launch is comparatively rare, a notable exception in this country being the launch of the battleship Texas in the Norfolk navy yard; although the use of stops, either alone or in conjunction with hawsers or spring lines, is quite common, as is also the use of drags arranged in a number of different ways. The launch of the Texas was described by Naval Constructor Wm. J. Baxter, U. S. N., and is a part of the proceedings of the society, Vol. 2.

In the absence of Assistant Naval Constructor Groesbeck, his paper on "Notes on Side Launches" was read by Assistant Naval Constructor R. H. M. Robinson. Two years ago Mr. Groesbeck submitted to the society a paper describing the launch of certain torpedo boats that were put into the water sidewise. His present paper was prepared for the purpose of adding to the proceedings of the society data regarding side launches of larger vessels, namely, the cruiser Galveston and suction dredge Benyuard. The paper with its illustrations is entirely descriptive of methods used in launching these vessels—particulars of groundways, sliding ways, tie pieces, triggers, etc., etc., these followed by details of procedure at the launch.

It was not expected that this paper would elicit discussion. There was no discussion of it.

Mr. W. A. Fairburn's paper upon "Launching of Large Merchant Vessels" was read in his absence by Prof. Cecil H. Peabody. This paper covered in some degree the matter touched upon by Mr. Hanscom, but there were discrepancies in the text, as for instance the weight of the ship as launched, one giving it as 10,000 and the other as 11,000 tons, which elicited several pertinent questions. Mr. Fairburn went into great detail concerning the launch of the Minnesota and contrasted it with the launching of other important vessels such as Kaiser Wilhelm II. and the Cedric. His conclusions were, however, attacked in several instances as inaccurate. Mr. Fairburn had declared, among other things, that the steamer struck the mud at the bottom of the river when launched, which Mr. Main declared was untrue, but that some of the floating timbers might have stirred up the mud. He also disagreed with Mr. Fairburn's observation that the tipping action invariably leads to mischief, saying that the Minnesota had a drop of 4 ft. His most painful duty, however, was to announce that Mr. Hanscom had called him up by telephone requesting him to deny a certain paragraph in Mr. Fairburn's paper, i. e., that he (Mr. Fairburn) was the designer of the ship. Mr. Main said that Mr. Hanscom claimed that distinction himself. It was unfortunate, indeed, that neither Mr. Hanscom nor Mr. Fairburn were present at the meeting.

Referring to the launch of the Mongolia and Manchuria at the yard of the New York Ship Building Co., Mr. James Swan presented the following launching data: Mongolia—Launching weight with cradle, 9,487 tons; launching weight per square foot on sliding ways, 2.48 tons; pressure on fore poppets, 2,570 tons; mean speed, 7.52 knots; inclination of ways, 11-16 in.; inclination of keel, 9-16 in. Manchuria—Launching weight and cradle, 9,957 tons; launching weight per square foot of sliding ways, 2.60 tons; pressure on fore poppets, 2,890 tons; mean speed, 7.11 knots; inclination of ways, 11-16 in.; inclination of keel, 10-16 in. Mr. Main thought possibly the discrepancy in the launching weight of the Minnesota might have occurred by one including the ways and the other omitting them.

The concluding paper, written by Lieut. L. H. Chandler upon the subject, "Some Notes on the Performance of the Torpedo Vessels of the United States Navy at Sea," was read by Naval Constructor Linnard. Lieut. Chandler's paper consisted of three elaborate tables giving data observed and reduced by the various officers of the United States torpedo boat flotilla, since its organization in the spring of 1902. The tables show that the work of compiling this data was undertaken on a very extensive scale from the beginning, only as the government can do such things. Table 1 describes very fully the fourteen vessels involved; table 2 gives the cruising itinerary of the vessels during the cruise on which the data was secured, and table 3, going into great detail, gives coal consumption, etc., of the vessels during actual cruising service at sea. Lieut. Chandler also sets forth some statements as to the general conditions of service under which the information was obtained. He adds that when he accepted the invitation to prepare the paper he had hoped to be able to get before the association similar data covering runs across the Atlantic ocean, but various causes operated to delay the departure of the flotilla, so that further information, covering runs to the Asiatic station, will have to be forwarded to be presented in addenda to the various tables. He apologizes for the tables as they now stand, with no data for the proposed long deep-sea runs.

An adjournment was taken after Mr. Lewis Nixon had announced that the council had decided to supply copies of the transactions of the society for the past five years to members at $3 per volume.

SENATOR HANNA AT THE BANQUET.

The concluding feature, as usual, was the banquet on Friday evening at Delmonico's. At the guests' table were Rear Admiral Bowles, president of the society; Clement A. Griscom, the retiring president; Senator Mark Hanna, who responded to the toast "The Merchant Marine and Subsidy"; Rear Admiral Barker, who spoke on "The Navy"; Rear Admiral Rae, who spoke on "Marine Engineering"; H. A. Haswell, who spoke on the toast, "Progress in the Art of Ship Building"; R. A. Post of the Newport News Ship Building & Dry Dock Co.; R. C. Davenport of Cramps; Naval Constructor W. J. Baxter, Col. R. W. Thompson, Lewis Nixon, Commodore Charles H. Loring, Homer Lee, George A. Gardiner and many others known in the ship building world. A letter of regret was read from President Roosevelt, who said that he was heartily in accord with the work of the society and greatly interested in the upbuilding of the navy and the merchant marine.

Rear Admiral Bowles presented, on behalf of the society, the loving cup to ex-President Griscom. In accepting the cup Mr. Griscom gave a brief history of the society, which he said originated in the minds of Rear Admiral Bowles and Rear Admiral Katz. He continued:

"Its members have produced a navy that, ton for ton, and gun for gun, excels anything in the world. I hope to live to see the time when the members of this society will be able to construct ships for foreign commerce as cheaply as any other country, and until that time comes the commercial supremacy of the American nation cannot be complete."

Senator Mark Hanna was greeted with prolonged cheers. In introducing the senator President Bowles said the people of the United States looked to Mr. Hanna more than to any other one man to help in establishing America's merchant marine. His interest in the work of the society, the senator said, was no new thing, and he thought the fact was appreciated. He spoke of the development of inland commerce, and said he had seen the vessels on our inland waterways grow from little boats of 500 tons to ships of 9,000 tons. "And," added Senator Hanna, "with the cheapest transportation in the world and at a profit of 75 cents a ton." He referred to the shipping bill, which, he said, failed in the upper house "for reasons I need not mention." Senator Hanna then referred to the Ohio campaign which "had just ended." The senator said that during that campaign he made the shipping bill an issue, and everywhere it was well received. He added:

"I did this that the public might know the bill was not dead. I looked upon it as an educational campaign. The farmers of the west do not know their interest in this measure. I have never met a man who, when his interest in this measure was explained to him carefully, did not admit his mistake. The charge was made against me by the opposition in Ohio that I supported this bill. I told my constituents that if they sent me back to the senate I would try again to pass the shipping bill, and that I would keep on trying until I got it through."

Senator Hanna paid a high tribute to Mr. Griscom, who, he said, had done great work for the success of that measure, and continued:

"We have a great country, and we are proud of it. We are a cosmopolitan people and proud of our success, but we are not proud of our merchant marine. One of the most important things we need today is an auxiliary to our navy. Those of us who had experience in the Spanish war discovered this. Our farmers did not know or appreciate our need in this direction. I told them that if there should be a war between this and any other important maritime country their grain would rot in their granaries, without an auxiliary to our navy."

NEW LAKE NAVIGATION SCHOOL.

The desire of the younger men aboard vessels of the great lakes to acquire a knowledge of navigation aside from the pilotage method that is special to the lake system, and the desire of these men to also put in the winter months at school work that will assist them in securing and advancing licenses for lake work, is attracting more and more each year the attention of teachers of navigation from the seaboard. Mr. Alfred D'A. McNevin of San Francisco has come to the lakes with the intention of conducting probably in Detroit a school of navigation that gives promise of being permanent and decidedly helpful to the class of men referred to. Mr. McNevin certainly comes well recommended and is going about his work in a practical and thorough manner. He is one of the principals of McNevin's Navigation School of San Francisco. This school, now conducted by Edmund H. and Alfred D'A. McNevin, was organized by Capt. Edmund H. McNevin in 1875 and is the oldest institution of its kind on the Pacific coast. Mr. Alfred D'A. McNevin has had a thorough training in this branch of teaching. At Berkley university he made a special study of magnetism as it affects the compass needle, so as to be proficient in the adjustment of the compass. The San Francisco school has the endorsement of all the leading captains and vessel owners of the Pacific coast. Since the organization of the school about 3,500 students have been graduated. Mr. McNevin does not come to the lakes to frown upon the practices that have made the special work of its pilots famous throughout the world, but rather to give to those that desire it school assistance in their progress towards advancement along lake lines and the added advantage of study of such parts of the science of navigation as are likely to prove of most value to them. His training from a teaching standpoint especially recommends him but not more so than his manner towards those whom he has thus far met on the lakes.

Mr. W. I. Babcock, well known in ship building circles throughout the country, is now the New York representative of the Wellman-Seaver-Morgan Co. of Cleveland. His offices are in the Maritime building.

Generated on 2024-08-27 15:59 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

SHIPMENTS OF MINNESOTA IRON MINES.

Duluth, Minn., Nov. 24.—Official figures as to ore shipments from mines in Minnesota during the season now closing are not yet at hand, but those given in the table below are so near to the exact amounts that they will serve for all purposes except those of positive record. It will be noted that as compared with last year there is a falling off on the Mesabi of 445,312 tons and on the Vermillion of 407,519 tons.

IRON ORE SHIPMENTS, MESABI RANGE.

Mine	Gross tons.	Mine.	Gross tons.
Adams	1,109,798	Lincoln	279,620
Agasy (new)	108,082	Longyear	81,823
Albany (new)	120,000	La Rue (new)	54,000
Biwabik	807,581	Mahoning	1,010,000
Burt	631,147	Malta	11,675
Cass (new)	52,905	Minorca	115,000
Chisholm	168,869	Morrow	49,409
Clark	300,604	Mountain	1,342,697
Commodore	20,436	Oliver	5,866
Corsica	34,044	Pearce	50,439
Croxton	100,645	Penobscot	1,630
Cyprus	122,201	Pettit	62,323
Day	107,640	Pillsbury	229,187
Duluth	149,706	Rust	160,660
Elba	93,630	St. Clair (new)	6,148
Fayal	1,460,815	Sellers	251,329
Franklin	64,026	Sharon	48,199
Genoa	303,713	Sparta	40,373
Glen	171,757	Spruce	585,815
Grant (new)	18,928	Stephens (new)	87,055
Hawkins	107,773	Stevenson	1,014,582
Hull	433,302	Troy (new)	15,000
Jordan	190,024	Union	91,496
Kanawha	24,844	Utica (new)	155,000
Kinney (new)	31,000	Victoria	27,973
La Belle	48,298	Winnifred (new)	31,869
Laura	97,782		
Leetonia	200,160	Total, 1903	12,897,528
Leonard (new)	7,750	Total, 1902	13,342,840

IRON ORE SHIPMENTS, VERMILLION RANGE.

Mine.	Gross tons	Mine.	Gross tons.
Chandler	460,548	Zenith	161,091
Pioneer	596,780		
Savoy	169,616	Total, 1903	1,676,744
Sibley	113,595	Total, 1902	2,084,263
Soudan	175,114		

WINDING UP LAKE SHIPPING SEASON.

The shipping season on the lakes is coming to its close and a couple of weeks at most will see the end of it. Ore that is being moved is largely found frozen in the docks at upper lake ports, so that the ore shippers may be said to be practically done. Coal tonnage was, during the early part of the week, in good demand and a number of boats took cargoes for the head of the lakes. Quite a large quantity of coal is still to go to Lake Michigan, most of it to be stored in the vessels. Grain tonnage, too, has been in demand during the past week, more so probably than at any time in the past, on account of the evidence of an early closing, but the rates have advanced only slightly. There are no signs of high grain freights unless it might be for a few tail-end cargoes.

LAKE CARGO RECORDS.

Provident Steamship Co. vessels are making new cargo records with the close of the season. The steamer D. M. Clemson of this fleet on Saturday loaded at Duluth 336,365 bu. of barley, equal to 8,073 net tons. The steamer J. H. Reed of this same fleet holds the grain record from the standpoint of weight, as she has moved 271,000 bu. or 8,130 tons of wheat. The Clemson's cargo of barley is next in weight to the wheat cargo of the Reed. The steamer D. G. Kerr, also of the Provident fleet, has eclipsed all records in soft coal. She loaded at the Hocking Valley dock, Toledo, also on Saturday last, 7,685 tons of soft coal for Duluth. This is 26 tons more than the cargo of the steamer John W. Gates (7,659 tons), which has been the record for some time past. Of course it is understood that on up-bound trips vessels are not loaded to the limit of draught with coal as they are in the ore trade. Cargo records corrected to date are:

Iron ore—Steamer Wm. Edenborn, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 8,807 gross or 9,864 net tons, Escanaba to South Chicago.

Grain—Steamer J. H. Reed, Provident Steamship Co., A. B. Wolvin of Duluth, manager, 271,000 bu. of wheat, equal to 8,130 tons (2,000 lbs.), Duluth to Buffalo; steamer D. M. Clemson, Provident Steamship Co., A. B. Wolvin of Duluth, manager, 336,365 bu. of barley, equal to 8,073 tons, Duluth to Buffalo; steamer Rensselaer, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 151,000 bu. of wheat, 94,000 bu. of barley and 55,155 bu. of oats (300,155 bu. in all), equal to 7,668 tons, Chicago to Buffalo; steamer Mataafa, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 185,399 bu. of corn, 40,000 bu. of rye and 43,600 bu. of wheat (268,000 bu. in all), equal to 7,619 tons, Chicago to Buffalo.

Coal—Steamer I. L. Elwood, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,688 net tons anthracite, Buffalo to Duluth; steamer D. G. Kerr, Provident Steamship Co., A. B. Wolvin of Duluth, manager, 7,685 net tons of bituminous, Toledo to Duluth.

NEW LIME-KILN CHANNEL CLOSED.

Owing to the difficulties which masters of vessels experienced in navigating the new channel at the Lime Kiln crossing the government has decided to close it for the balance of the season and the lightships have been moved to their former positions, marking the old channel. Of course the most serious accidents were those of the Brown and Curry, but fully half a score of boats bumped into something or other. The government engineers claim that the new channel is superior to the old and has a foot more water. They admit, however, that an unfortunate time of year was selected to inaugurate it to navigation, as the stage of water is subject to greater fluctuations now by reason of wind storms. Discussing the matter, Assistant Engineer Dixon said:

"The trouble has not been that the boats have struck boulders or obstructions in the new channel. The Brown went on the bank between the old and new channel because the captain did not have enough headway to control his boat and drifted down the crossing broadside. He said he could feel the boat rubbing the bottom all the way down to where he fetched up. There are no boulders or lumps or ridges between the two channels. He did not strand on a boulder, but the rubbing along the edge of the old channel stopped him and he filled his water bottom to prevent his going further until he was lightered. The great difficulty is that masters are not used to the new channel and will have to learn to run it. There is a shoal to the westward of the Lime-Kiln crossing and the current around it is now about 3½ miles an hour. Boats have heretofore been coming down the old channel drawing within an inch of all the water there is over the crossing. The current on that side is not so strong. Naturally, when coming through the new channel, they come slow, as it is an experiment. Coming down from the upper river the current catches them and on account of not having enough headway the stern swings around and they come down almost broadside, and a 400-ft. boat coming down broadside a channel 180 ft. wide is sure to hit something. If masters would come into the new channel from above with more speed and get away from the current, there would be no trouble. They must experiment and learn how the new conditions affect their big boats. In order to do this they should have the most favorable conditions, and these the fall of the year does not offer."

WANTS AMERICAN REGISTER FOR THE MIRA.

Mr. F. A. Gilchrist of Alpena is at present in Washington endeavoring to get an American register for his steamer Mira. The steamer is foreign built, but went ashore off Nova Scotia. She was abandoned by the owners, and James Reid, the wrecker, undertook to release her. He succeeded in doing so and Gilchrist subsequently bought the steamer from him. It is Mr. Gilchrist's contention that the repairs upon the steamer amount practically to a rebuild and are sufficient to entitle the steamer to American register. She has been converted into an oil tanker in an American yard. Of course registry for this vessel is being vigorously fought by steamship men engaged in the coastwise business. Their efforts in the last congress were successful, but Mr. Gilchrist is a persistent fighter and he still believes he has a good case.

Speaking of the lake trade and losses which have marked the vessels of the Gilchrist fleet this season, he said that money had been lost, of course, on the wrecked boats, but that when one loses an old boat it is like discarding an old suit of clothes.

AROUND THE GREAT LAKES.

A cargo of 248,000 bu. of wheat taken out of Fort William a few days ago was the largest grain cargo ever loaded at that port but by no means the largest of the lake grain cargoes. The Provident Line steamer J. H. Reed has a record of 271,000 bu. or 8,130 tons of wheat.

The large steel tug Emerson, built by the Collinwood Ship Building Co. for the Montreal Transportation Co., was launched last week. The tug is 118 ft. long, 23 ft. beam and 13 ft. 9 in. deep. She is fitted with triple-expansion engines of 850 H. P. and is equipped with all modern appliances.

Mr. George Uhler, supervising inspector-general of the United States steamboat inspection service, has concluded his investigation into the sinking on Green bay recently of the steamer Erie L. Hackley, in which thirteen lives were lost. The findings will not be announced until the official report is made at Washington.

The missing steamer Erin, for whose safety fears were entertained, was found by the tug Ainsworth and towed to Sault Ste Marie. She was floating helpless in the seas, having deranged her machinery. Twice her cargo of grain shifted but the vessel was saved by the crew who worked frantically to minimize the list.

Two years' operation of a fleet of dredges in South Chicago harbor ended a few days ago, when the contract for deepening the basin at the mouth of the Calumet river was completed. Twenty feet of water is available for vessels throughout the harbor and for several hundred yards up the river. Over 2,000,000 cu. yds. of earth has been removed.

Lens-lantern lights, showing fixed red during periods of 10 seconds separated by eclipses of 10 seconds' duration, have been

Generated on 2024-08-27 15:57 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

established 32 ft. above mean lake level, on the steel towers recently erected on the easterly and westerly ends of the breakwaters at the entrance to Portage Lake ship-canals. The temporary fixed red post-lantern lights have been discontinued.

The Nicholas Transit Co., owners of the steamer John G. Glidden, have sued the Pittsburg Steamship Co. for $50,000 damages. The Glidden was sunk in the St. Clair Flats ship-canal in collision with the Steel Corporation's barge Magna and the Magna is blamed for the accident. Of course the action on the part of the owners of the Glidden is in behalf of the underwriters.

The steamer S. C. Baldwin was wrecked in Green bay off Long-Tail point last week by plunging ice floes driven by a strong wind. She was towing the schooners Spademan and Butman at the time. She was forced to drop her consorts and whistle for help. The Goodrich Line passenger steamer Georgia answered and took off her crew, the Baldwin subsequently sinking with her bow out of water. The schooners were later picked up by tugs.

The steamer Gladstone of the Bradley fleet was sunk in collision with the steamer Sacramento at Bar point last Saturday morning. Owing to rough weather wreckers could make little progress towards saving the vessel, the hole in her side being a large one and succeeding seas sweeping away whatever patches were placed upon it. She carried a cargo of grain, most of which has been pumped into the lake in the effort to free the steamer. Her cargo, will it is expected, be a total loss.

Capt. Robert H. White, an old vessel man, died at Detroit last week. He was born at Beansville, Ont., Feb. 12, 1832. He had made his home at Detroit since he was nineteen years old. He began sailing before the mast when a boy and rose to be commodore of the Bradley fleet when it was one of the largest on fresh water. He finally bought an interest in the steam barge Nahant of which he was master for a number of years. He retired about ten years ago. He leaves a widow and two children.

Following is a notice just issued by the department of marine and fisheries, Ottawa, regarding lake lights: "Instructions have been issued to all light-keepers in the Canadian government employ to keep their lights in operation as long as any navigation is possible within sight of them. The only exceptions are the lights on the north shore of Lake Superior. We have arranged to take the light-keepers away from these stations after Dec. 1 this year. An attempt will be made to keep a man at the station until after navigation is closed in future years."

An order for a steel lighter a little larger than the Newman but equipped with wrecking machinery similar to that carried by the Newman was to have been given to some one of the lake builders this fall by the Great Lakes Towing Co., but officers of the company think prices are too high at this time and will probably not have the vessel built. Members of the executive committee of the towing company, who met in Cleveland a few days ago, express special satisfaction with Mr. Coulby's management and are very much pleased with the outlook for early return to a more substantial condition of the company's affairs than has existed since its organization. Mr. Coulby submitted plans for a floating dry dock at Fairport and the members of the committee decided to build the dock. The company has a place at Fairport suited to repairing boats and after the dry dock is completed repairs on most of the tugs that are stationed at Lake Erie ports will be made at that port. The dock will be about 75 ft. long, large enough to take in the largest tugs owned by the company. The tug Chris Grover and two other tugs will be rebuilt at Fairport this winter.

The steamer Portage of the Union Transit Co.'s line had a narrow escape from foundering in Lake Erie this week. She left Buffalo without cargo on Sunday night and was within two hours of Cleveland when her steam pipe burst and all her boiler connections gave way. She was towed to Cleveland badly broken.

BOND CONVERSION SYNDICATE ENDED.

Satisfaction is felt on all sides that the agreement with the so-called bond conversion syndicate has been cancelled by the directors of the United States Steel Corporation. When the corporation offered to exchange $200,000,000 of its preferred stock for 5 per cent. bonds the shareholders were given until a certain date to turn in their stock. Altogether members of the syndicate and others turned in about $133,000,000 worth of stock. After that date conversion became the exclusive right of the syndicate. It is interesting to note the result. The preferred stock, under repeated onslaught, became depressed until at one time it actually broke below 50. The syndicate managers were buying the stock at the low rate of 50 and turning it in for bonds at 65, those being approximately the ruling prices for the two securities. Of course the syndicate, buying a thing for 50 and selling it for 65, was reaping a profit of $15 per share; but the amusing point is that the corporation was to pay 4 per cent. additional for their services in performing this extremely profitable work for themselves. The directors finally stepped in and caused J. P. Morgan & Co. to cancel the agreement with the syndicate and the market resumed a more healthful tone at once.

There is much speculation regarding future dividends but no actual information can be obtained. It is reported that the dividend on common, now 2 per cent., will be discontinued. This does not seem at all unlikely. There is also talk of a reduction of preferred dividends to 5 per cent., but this rumor appears to be baseless.

Biwabik Mine of Mesabi Range, owned by the United States Steel Corporation.

APPLICATION FOR PERMANENT RECEIVER.

The Mercantile Trust Co. of New York made application last week in the United States court before Judge Kirkpatrick for the appointment of a receiver for all the property of the United States Ship Building Co. A rule to show cause, returnable in Newark this week, was granted. The petitioner asks that a receiver be appointed who shall take possession of all the property of the company now in the hands of Receiver James Smith, Jr. The trust company, as trustee of a $16,000,000 mortgage, avers that in July last there was a default in interest on the bonds amounting to $400,000, and a further default at the same time of $200,000 for the sinking fund created for the retirement of the bonds. It is alleged that the right of the trustee to foreclose became absolute at the moment of the appointment of Receiver Smith. The petitioner recites the fact that all the properties of the ship building company are now in the hands of Receiver Smith, and declares that the petitioner has the right to control these properties.

There is some talk of a compromise, but nothing definite is known about it.

Messrs. A. E. Outerbridge & Co., agents of the Quebec Steamship Co., Ltd., make the announcement that the company has just entered into contract with Sir James Laing & Son of Sunderland, for a 5,000-ton twin-screw steel steamer of 16 knots sustained sea speed for their Bermuda line. The dimensions of this steamer are 425 ft. long, 50 ft. beam and 36.6 ft. deep, with highest class accommodations for 240 saloon passengers, thirty-two second-class and forty-eight third-class passengers. The engines are to be triple-expansion with cylinders 26, 42 and 71 in. in diameter by stroke of 48 in., and will be driven by three double-ended and three single-ended boilers of 200 lbs. pressure. The vessel will be lighted throughout by electricity and have large cold storage capacity for the carriage of green vegetables from Bermuda, and meats, etc., from New York. The steamer is to be delivered by Nov. 1, 1904.

Cramps have finished their overhauling of the American Line steamer St. Paul and she will resume her runs this week.

Generated on 2024-08-27 16:00 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

NEW WORTHINGTON WORKS.

An extensive pump manufacturing plant, the largest in this country and probably in the world, is now under construction at Harrison, N. J. It is to be occupied by the firm of Henry R. Worthington, who employ about 3,000 men in their present works at South Brooklyn, L. I., and Elizabethport, N. J. The new works at Harrison will accommodate from 4,000 to 5,000 men and will cost in the neighborhood of $2,000,000. They consist of a main machine shop with side galleries over 1,006 ft. long, an erecting shop 592 ft. long and of the same section as the machine shop and a high erecting shop 210 ft. in length and four galleries in height in the side bays connecting the two shops. The main foundry is 600 ft. in length, and there is also a special foundry for small work, 410 ft. in length, with a building 200 by 60 ft. for cleaning castings connecting the two. The pattern building is four stories high and 550 ft. long and is divided by fire walls into four sections. The north section will be used for offices and drafting rooms, the adjoining section for the pattern shop and the balance of the structure for pattern storage. The power house, which will be equipped with modern boilers, engines and generators, is a building 172 by 102 ft. Electric power distribution is to be employed throughout and the grounds will be illuminated by electric arc lights. There are many other buildings which will be used for packing, storing and shipping goods, etc. The buildings are so arranged that additions can be built when the work demands it. All will be connected by a complete system of railroad tracks entering the ends of the buildings and placing the works in direct communication with the Delaware, Lackawanna & Western, the Erie and the Pennsylvania railroad systems. The new plant will be devoted entirely to the manufacture of water works machinery, water meters, cooling towers, condensers, feedwater heaters, centrifugal pumps and steam pumps of all kinds.

AMERICAN SHIP WINDLASS FOUNDRY.

Following is a description of the brick foundry recently completed and put into operation by the American Ship Windlass Co. of Providence, R. I.:

The main building is 150 ft. long by 105 ft. wide. The foundry is operated and lighted by electricity. It is equipped with a 10-ton electric crane and a 5-ton hand crane. The cupola is capable of melting 9 tons per hour and is driven by a positive pressure blower. The rattlers, blower and grinder are driven from motors located in the foundry building, which receive their current from a generator in the main power house on the opposite side of the street. The supply wires, and also the gas, steam and water pipes, are in an underground tunnel, which connects the foundry with the main plant, and the tunnel is also intended as a thoroughfare through which the castings and patterns can be carried. This tunnel is 6 ft. high by 7 ft. wide and 59 ft. long. The foundry has one large core oven 18 ft. long by 14 ft. wide and a circular core oven 6 ft. in diameter. Arc lights are used for general lighting and incandescent lights are placed at the benches and around the molds. The foundry is protected by automatic fire sprinklers.

Just outside the building proper is a 15-ton wagon scale. On the easterly side of the building is a wharf 200 ft. long, which is surmounted by a trestle and shears for the unloading of sand, coal, pig iron, etc., from vessels. The shears are at the same height as the top of the sand bins, which are of Portland cement concrete, and are provided with manholes in the top for dumping the sand. The top of the sand bins is also at the same level as the charging floor, so that no elevators or hoists are required for the handling of the material. On top of the sand bins and adjacent to the door of the charging floor is a coal and coke shed, and the pig iron is stored on the ground at the level of the charging floor. A scale is built into the trestle for weighing the material as it is unloaded, and there is another scale in the charging floor for weighing the material used in the charges. The wharf is provided with a wharf drop in the Winter patent, of which the American Ship Windlass Co. is the manufacturer, and which is generally used all along the Atlantic coast. There is also a steam hoister of American Ship Windlass Co. manufacture on the wharf, and the unloading of vessels is done by means of this hoister. There is 15 ft. of water at this wharf at low tide, and in addition for use in connection with the foundry the wharf is also designed for facilitating repairs to machinery on shipboard and installing new machines, as vessels can come to the wharf and the repairs be made or new work installed with the expenditure of the least possible time.

NEW AMERICAN STEAM GAUGE PLANT.

The American Steam Gauge & Valve Mfg. Co. has again been compelled to seek new quarters, owing to the increase of their business, and are at present removing their entire plant and offices from Bismark street, Roxbury district, to the large brick buildings, 208-220 Camden street, Boston. The buildings have floor space of 85,000 sq. ft. The Mowry & Phillips foundry department will also be removed from South Boston and all branches of the business consolidated at the Camden street factory. The new plant will be of more than double the present capacity, and will be employed in producing valves, gauges and indicators; also special metals and foundry work in the Mowry & Phillips department.

Low rate for Thanksgiving via the Nickel Plate road for points within 150 miles from place of starting. Tickets on sale Nov. 25 and 26, good to return till Nov. 30, 1903, inclusive. See nearest agent or address E. A. Akers, C. P. & T. A., Cleveland, O.
207, Nov. 30

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (SEPTEMBER, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	355,560	H. P.
English Royal Navy	929,300	"
Russian Imperial Navy	227,500	"
Japanese Imperial Navy	122,700	"
Austrian Imperial Navy	56,700	"
Italian Royal Navy	13,500	"
Chilian Navy	26,500	"
Argentine Navy	13,000	"
The "Messageries Maritimes" Company	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500	"
Total Horse Power of Boilers in Use	1,850,860	

Societé Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France. Telegraphic Address: Belleville, Saint-Denis Sur-Seine

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

SHIP SUBSIDIES NOT FAVORED.

Editor Marine Review:—You will no doubt agree with me that information should always be "the truth, the whole truth, and nothing but the truth." In your issue of Nov. 5 Mr. Ballard presented several extracts of opinions favorable to ship subsidies from the Protectionist for October, from which readers may infer that this magazine supports a subsidy policy and furnishes literature as argument therefor. This is not the case. The facts are that the Home Market club and its organ, the Protectionist, support, not a subsidy policy, but the constitutional policy of our early history, to wit, "regulations of commerce"—navigation laws—for the recovery and maintenance of our carrying trade with foreign countries. Desirous of knowing the side on which the weight of public opinion now stood, a canvass of the shipping question was made and the results printed in the October issue of the Protectionist. Most of the replies to the questions of the circular sent out to prominent persons in various professions, trades and occupations representative of the American people were expressed by "yes" or "no," but a goodly number replied otherwise, and their views were given space. It is from those that Mr. Ballard has quoted, confining himself to subsidy advocates. His object may have been to show that some of such advocates survive, but he might have quoted more enlightened views and stated that 65 per cent. of replies favored a policy of just discrimination in favor of American ships. The editor of the Protectionist states the result of the canvass in the following table:

RESULT OF THE CANVASS—THE COUNTRY AT LARGE AND BY SECTIONS.

Tables U. S.	Duties and regulations.	Subsidies.	Both.	Neither.	Totals.
	456	132	86	29	703
New England	256	62	35	6	379
Middle States	73	30	8	7	118
The south	63	19	15	9	106
The west	53	13	6	6	78
Pacific coast	11	8	2	1	22

The eighty-six for both regulations and subsidies may be added to the 456 for duties and regulations, on the ground that subsidy is applicable to mail steamers and regulations of trade to the general marine. This being allowable, it will be seen that 77 per cent. of opinion favors the constitutional policy, while but scant 19 per cent. favors the very questionable policy of subsidizing the general marine. And the most of these people think, if the nations of Europe may subsidize we may also adopt that method. They forget that those nations have governments quite different from our own, especially in the limitations of their constitutions. Not a single subsidy advocate can point out any power conferred on congress, either purposely or incidentally, to subsidize any business, trade, occupation or profession. On the other hand, it cannot be controverted that the constitution purposely provides a method for the encouragement of navigation—shipping and the ocean carrying trade. This method is the regulation of our foreign commerce in so many words. This method was put into force through our early national legislation. The suspension of this method has ruined the carrying trade which was based upon its efficacy. This policy must be restored, or no American marine worthy of our great commerce and a credit to our republic will ever develop. It is not a pull at the teat of the treasury, but an American shipping policy free of the taint of "aid" that is wanted.

Denver, Nov. 18, 1903. WILLIAM W. BATES.

If this programme of concentration is consummated, the fine offices in the Empire building, Broadway and Rector streets, now occupied by the American and Red Star lines, will be on the market for sub-letting.

Position Wanted as Foreman.

Englishman wants position as foreman in machine shop department of heavy forge or marine shop. Address Box 53, Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland. Nov. 26

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

Seaboard Steel Casting Co., Chester, Pa.

ITEMS OF GENERAL INTEREST.

The White Star liner Baltic, largest steamer in the world, was successfully launched from the yard of Harland & Wolff, Belfast, Ireland, last week. Her displacement is 39,800 tons.

It is announced that the object of the International Mercantile Marine Co. in planning to concentrate its offices in New York is to secure greater convenience for the public and more efficient and economical administration.

Naval Constructor Homer L. Ferguson has been appointed assistant to Chief Constructor Capps and will enter upon the duties of his new office on Jan. 1. He is at present engaged in superintending the construction of warships at the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va.

The Engelhardt collapsible lifeboat was tested last week at the works of Lane & DeGroot, Long Island City. The test was for the benefit of a committee appointed by the department of commerce and labor. The Engelhardt boat has already been approved by the navy department. The boat is made of oiled canvas with a wooden flooring. A stone weighing 2,800 lbs. was placed on the lifeboat, and fourteen men of an aggregate weight of 2,123 lbs. jumped into it, making a total weight of 4,923 lbs.; yet the boat drew little water. No opinion was expressed regarding the merit of the boat but the committee appeared to be well pleased.

John A. Penton of Detroit, who recently retired from the position of commissioner for the National Founders' association, a place which he has held since the association was organized, was accorded very high honor at a meeting of the foundrymen in Washington recently. He was presented with a testimonial in the form of a bound volume of letters from different members, pasted on parchment, expressing their appreciation of his labors in behalf of the association and a beautiful diamond ring of three stones. The presentation speech, made by Mr. O. P. Letchworth of Buffalo was highly complimentary, referring to Mr. Penton's great energy, enthusiasm, ability, loyalty, good judgment, etc.

The proposed steamship service between Canada and France will be inaugurated in April next with a fleet of 4,000-ton steamers which Mr. Colombier of Bordeaux is now having built. The Dominion government is to pay to Mr. Colombier a subsidy of $133,133.33 per annum. Of the four steamers to be put into the service, two are to fly the British flag, and will, of course, by that act be excluded from French bounty. The Dominion government has investigated the financial responsibility of the house of Colombier and finds that it is ample. Doubt is, however, expressed by conservative ship owners as to the eventual success of the line. The subsidy will help but unless the project is commercially sound it cannot live.

Steamships, Government, Revenue and Lighthouse Vessels, Yachts and Boats of all descriptions

Supplied with

FURNISHINGS

"From Steerage to Captain's Cabin."

Covering everything that can possibly be required in

Furniture, Beds, Carpets and Rugs, Upholsteries, Bedding, Groceries,

Galley Ranges, Galley Utensils, Monogram and Crested Linens, China and Glassware, etc.

Detailed work requiring special plans or sketches carried out by expert operators.

We gladly submit Estimates free of charge.

PROMPT DELIVERY OF GOODS.

Address CONTRACT DEPARTMENT,

SIEGEL COOPER CO.,

6th Ave., 18th and 19th Sts.,

NEW YORK CITY.

Please mention Marine Review, when writing.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

IMMUNITY FROM FIRE, VERMIN AND PESTILENCE ON SHIPBOARD.

By George W. Ramage.

In the issue of June 4 last of the Marine Review and Marine Record there appeared an article by me captioned "Fire and Vermin on Board Ship," and, as I had written at considerable length, I thought at the time that I had exhausted the subject. But upon further investigation I find I had but written the opening chapter. The article alluded to had reference particularly to the Clayton gas system for extinguishing fire, exterminating vermin, disinfection and fumigation on shipboard, and also on land, and this article only emphasizes the one alluded to so far as regards the Clayton system.

Every reader will recognize the fact that the terrors of fire and the plague of contagious disease and vermin are to be dreaded on land, where one may, under ordinary circumstances, run away from them. But, on board ship, on the water, it is plain to the casual observer that the horror and dread of these things are multiplied a hundred fold, for in such a situation there is no escape from the inevitable. It is a literal case of placing the victim "between the devil and the deep blue sea." Hence it is on the prevention of holocausts and plagues on shipboard, and the spread of contagion by vessels plying to and from infected ports, that I would now particularly write. It is self-evident that anything that will ameliorate the evils mentioned, let alone prove a perfect cure, should be of interest not only to those who sail the seas, but to the ship owner, shipper and general public as well.

Heretofore superheated steam and sulphuration by burning sulphur in open furnaces have been resorted to for the purposes of extinguishing fire, disinfecting and fumigating on shipboard and in port, but these methods have given unsatisfactory results, both of them being too slow, dangerous and uncertain to warrant their utility. This leaves but one method in use at the present time that has proved—under the most severe tests—to be capable of filling all requirements, that method being the Clayton gas system. Strange as it may appear to the average citizen of the United States, while this gas was discovered in this country by Mr. Thomas Clayton, then a citizen of Philadelphia, other countries have been the first to recognize its superiority over former methods and to adopt it as the best, surest and safest means for fire extinction and destruction of vermin and disease microbes yet discovered. As a consequence it is now in use in Great Britain, France, Germany, Australia, South Africa, China, Brazil, Chile and Ecuador, both on board ships and at ports, with other nations contemplating its adoption. Its adoption by the various countries named is an apt illustration of the truth of the adage, "A prophet is not without honor save in his own country."

The French government, ever alert to the value of scientific discovery, was among the first to investigate the merits of Clayton gas, putting it to the most severe tests, which were conducted by Professor Proust, inspector-general of sanitary service, and Dr. Paul Faivre, inspector of health service in the ports, under direction of the minister of the interior. The report of their investigations caused that official to address a circular, bearing on the subject of disinfection on shipboard, to the various health officers at French ports, dated "Republic of France, Paris, July 20, 1903." This document, after citing the various circulars and instructions issued by the department under dates of Aug. 4, 1899, Sept. 26, 1901, and April 12, 1902, regarding the disinfection of vessels by sulphuration (in the latter of which was noted the fact that while sulphuration carried out by means of furnaces burning in the open air was an improvement on former methods, and an advance towards a solution of the problem of perfect disinfection, it gave only imperfect results), continues as follows:

"Researches lately carried out in France, as well as abroad, have proven that the destruction of rats and insects may be effectively accomplished on board vessels to the great advantage of international prophylaxy. The time has come to generalize this operation and to make it compulsory by any process recognized by the sanitary authorities as efficient in construction and application.

"Today one process meets these conditions. The experiments, continued for more than a year, successfully carried out at the port of Dunkirk, on the use of the Clayton apparatus, have demonstrated its capability of satisfactorily filling the different requirements of the proposed programme. The report of Messrs. Proust and Faivre, in the name of the general inspection of the sanitary service, explained the mode of operation and gave the results. The findings of this report were confirmed by the Comite Consultatif d'Hygiene Publique de France, at its meeting held May 12, 1903. By a circular letter of June 20, I brought these facts to the notice of the chambers of commerce of the ports, and called attention to the advantages that ocean navigation would realize therefrom.

"It is to be desired that all vessels touching at any time at ports contaminated with plague or yellow fever be provided with an apparatus that allows them to carry out on sailing, on the voyage or on arrival, a sulphuration reaching all parts of the vessel and assuring as complete a destruction as possible, not only of rodents and insects, but also of any pathogenic germs that may be contained in the quarters or the goods on board the vessel."

When this (Clayton) apparatus is found on board a vessel, and the sanitary authorities have satisfied themselves that it has been efficiently employed, the greatest facilities are to be accorded for the sanitary visit, and the entry and discharge of the vessel. The dues are to be reduced to the minimum prescribed by the rules, and the vessel may be admitted to ports hitherto closed to ships arriving from contaminated countries.

The circular concludes as follows: "Any vessel not provided with an apparatus must submit to sulphuration by means at the disposal of the port, the operation to be compulsory; the duty of the sanitary authorities being to watch the operation and obtain results."

As I write I have before me a statement, in tabulated form, of thirty-six vessels and their cargoes, which discharged or touched at the port of Dunkirk, France, which, all hailing from bubonic plague regions, between Sept. 7, 1902, and July 23, 1903, were disinfected at that port by means of the Clayton apparatus, with their cargoes on board, which consisted principally of various seeds, grains, oil cake, cotton and spices. As some of these vessels were bound for ports of other European countries, especially those of Great Britain and Germany, from whence the cargoes would naturally be diffused around the globe, this act on the part of the French officials, while undoubtedly done for the welfare of their own country, is deserving of the thanks of the civilized world. One feature of the statement worthy of more than passing attention is the following: "It is to be noted that nothing was put ashore from these vessels during fumigation and not the slightest damage was observed, and that the crews and passengers remained and slept on board as usual without inconvenience."

This testimony from France is surely strong commendation of the Clayton gas system, but no stronger than that emanating from ship owners, masters and sanitary officials of other countries, who have used the apparatus. In fact, all who have witnessed its operation are earnest in their praise of its value for extinguishing fire, disinfecting and fumigating purposes.

The Neue Hamburger Boersenhalle, in a late issue, notes that among other stipulations made by the Mexican government upon entering into a contract with the China Commercial Steamship Co. for the importation of coolies for Mexican plantations, was this one: "The transport steamers must be provided with disinfectants and with a Clayton apparatus for the disinfection and fumigation of the ship." This goes to show that Mexico is keeping abreast of the times in sanitary matters, even in advance of our own United States, of which we are wont to boast as the most enlightened country on the globe.

However, American steamship companies and ship owners are beginning to appreciate the value of such an apparatus on board their vessels, as attested by orders given for their installation on board vessels of the Standard Oil Co., Pacific Mail Steamship Co. and the Great Northern Steamship Co.

While I have only mentioned ocean going vessels as installing the Clayton gas apparatus, the fact is apparent that it is needed on lake and river craft as well, for who would not prefer to patronize the boat that protected passengers and freight from the danger of fire and the pest of vermin. Even more than a pest are vermin, especially the rat, bedbug and mosquito. The loathsome bedbug is to be dreaded, as he is a disease breeder, a fact just beginning to dawn on mankind, while the ability of the mosquito to inoculate its victim with fever germs is well known.

I was lately contemplating a trip on a certain river steamboat line and mentioned my intentions to a friend, who said: "You'll find the berths on the boats of that line inhabited; they are regular bedbug breeders." I didn't take the contemplated trip on that line. One may go into a hotel and find such things creeping about, but in that case one can seek other quarters, but aboard a boat—well, there you are; and the "pestilence that walketh in darkness," if about, will seek you and find you, and while he is sucking your good healthy blood he is mayhap inoculating you with the virus he drew from the consumptive—or, worse, on whom he feasted the night before. Horrors! Out with the pests!

It must be borne in mind that Clayton gas when turned into a ship's hold or cabin permeates into every crack and crevice, going through mattresses and pillows as though they were gauze, hunting out and killing all vermin, and a good feature of its work is that it causes them to come forth from their hiding places and die in the open, from whence they may be readily found and removed.

From all reports there are a great many hospitals, hotels and other public institutions throughout the country that should be provided with this apparatus. I lately saw a report on the fumigation of a hospital in Paris, France, by Clayton gas, which was simply astounding. I will not give details, but will refer all interested to the Clayton company, which will no doubt furnish enough details and testimonials to convince the most skeptical that I have written in great moderation of the virtues of the gas.

The company has a disinfecting plant at the harbor of New York, where they lately disinfected the Dolphin and Hydrographer, government vessels, thoroughly cleaning them from all vermin, much to the satisfaction of their officers and crews, as attested by letters since received by the company from the commanding officers of the vessels.

For the betterment of their service, by way of greater safety and comfort to their patrons, not to mention a saving on insurance rates, I would naturally suppose that every water transportation company and vessel owner in America would seek to get into communication with the manufacturers of this apparatus for the United States and Canada. For the benefit of all such I give the address, namely, Clayton Fire Extinguishing & Disinfecting Co., 11 Broadway, New York city.

Generated on 2024-08-27 16:30 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

OIL FUEL.*

By A. M. Bell, (England).

The increasing interest and steady progress in the employment of oil as fuel for various purposes suggests the compilation of the paper submitted. Oil fuel has been a favorite field for the ingenuity of inventors for many years. The first applications appear to have been made in France, but numerous experimental installations have followed, and in Russia its general employment may be said to have commenced about 1870, when the development of the enormous oil supplies of the Apcheron peninsula became an accomplished fact, and the first oil-fuel steamer appeared on the Caspian sea. In the United States, where the crude oil of the Pennsylvanian field contains a larger percentage of light oil, the use of liquid fuel until recently has been on a less extended scale; now, however, the discoveries in California and Texas have provided enormous supplies of crude oil, practically only suitable for this service, and great advances have consequently been made in its use. In this country many attempts have been made, but owing to the absence of regular supplies, progress has not been so rapid as in the cases mentioned above. The manufacture of oil gas and carburetted water gas has, however, thrown on the market products of a character only suitable for fuel, and rendered its adoption possible on a limited scale.

The different methods of burning oil fuel may be summarized as follows: (1) Those wherein it is burned in bulk form; (2) in a sprayed or atomized condition; and (3) consumed as vapor or gas. The first-mentioned procedure has received most application in Russia, whereas the last has enlisted most attention in the United States owing to the lighter character of the oils available. Generally, however, the second or spraying system may be looked upon as the favorite, most generally adopted, and probably the most successful; hence the chief attempts at improvement appear to have been devoted to it. The most effective device is doubtless that requiring the least quantity of the atomizing agent (steam or compressed air) for operation, and until recently the attention of workers in this direction has been centered on the burner employed, the construction of the furnace, which is of as much importance for a good result, being somewhat neglected. Further, a due consideration of the admittance, distribution and temperature of the air for combustion is absolutely essential to success.

The latest developments of spraying apparatus point to the employment of oil fuel under pressure, heated to a high temperature, sprayed with dry steam, and the fire fed with heated air for combustion. For steamers the use of oil fuel possesses advantages over coal in excess of those which can be urged in its favor when employed on land. Reduced storage space, less number of men required, an increased steaming capacity from a given supply of fuel, are points of the greatest value from the marine aspect of the question. For locomotives the assistance of oil fuel is valuable on the long runs without stopping, now becoming common, the difficulties of firing and the trouble from dirty fires being no longer present. The application in this direction has been much improved and simplified during the past few years with a view of securing the reliability of the apparatus under all conditions of service, and the method devised by Mr. Holden, of the Great Eastern railway, of arranging the apparatus has been extensively adopted owing to the opportunities it affords for the use of solid or liquid fuel, or both, at will or as circumstances may make most desirable.

In Russia and the United States some hundreds of locomotives are regularly running, using oil as fuel; and numerous examples are to be found in this and other countries where coal has become an expensive commodity. For furnace work oil fuel offers unique advantages, and many interesting applications have been made to meet the special requirements of annealing, tempering, metal melting, brazing etc. In glass making and enameling oil fuel has met with considerable adoption, and portable furnaces of all kinds are successfully operated with it; in bridge-work, ship building, etc., oil-fired rivet furnaces are to be preferred to any form of solid fuel-heating device. In storage oil fuel has many favorable features. It occupies a minimum of space, does not deteriorate by exposure, and is easier of transportation and distribution. In the far east and many oriental countries the importation of oil fuel has now become a regular undertaking, and supplies are guaranteed in many cases where wood has become scarce and imported coal an almost prohibitive article.

*Paper read before the British Association for the Advancement of Science.

Dredging Plants for Sale.

For Sale.—Two dredging plants complete, consisting of two dredges, tugs Maytham and Duncan Robertson; also five dump scows and two flats, with sundry duplicate parts of machinery, etc.; also extra spud anchors and dipper teeth, etc.; all having been kept up in good working condition and comparatively new, and could be delivered at once on satisfactory sale. For further information as to capacity and prices of each plant inquire of James Pryor, Houghton, Mich. Dec 17

Engine Wanted.

Wanted fore and aft compound engine, size 10 and 20x14 in ; possibly a little larger will do Must be in first class condition and ready for immediate shipment. Address Abram Smith & Son, Algonac, Mich. Nov. 26

Tug for Sale.

Tug Warwick—Engine 15x17. Boiler allowed 110 lbs. steam. Both in first-condition. Hull practically new. Boat inspected and ready to run. Cheap for cash. Can be seen at Toledo, O. Apply to James Rooney, 1118 Collingwood ave , Toledo, O. tf

Marine Boilers for Sale.

For Sale—A number of various styles of marine boilers in good repair For further particulars apply to Howard S. Folger, Kingston, Ont. tf

Galveston, Texas, Oct. 7, 1903.

Sealed proposals, in duplicate, for grade raising at Galveston, Texas, involving over 11,000,000 cubic yards of filling, will be received by the Chairman of the Grade Raising Board, until 2 P. M., Dec. 7, 1903, and then publicly opened. For information apply to E. R. Cheesborough, Secretary Grade Raising Board, Galveston, Texas.

Dec. 3 C. S. RICHE, Consulting Engineer.

WHITE OAK

TIMBERS, PLANK AND DIMENSION STOCK

F. S. SHURICK,

18 Broadway, NEW YORK CITY

Engine for Sale.

For Sale —Fore and aft compound engine, 27 and 50x40 in. Has been entirely overhauled and is as good as new High pressure cylinder can be reduced if desired Engine is now at shops of Montague Iron Works, Montague, Mich. For further particulars address the Montague Iron Works tf

For Sale.

Tug Duncan City. Address, Geo. Pankrantz Lumber Co., Sturgeon Bay, Wis. tf

For Sale.

Fitout off steamer Badger State consisting of yawl boats, life rafts, new electric light plant, cabin furniture, etc. Apply to H. R. Havey, foot of Randolph street, Detroit, Mich. Nov. 26.

Small Steam Barge for Sale.

I have for sale a small steam barge Carries 250 tons. Address, Capt F. E Wood, Alexandria Bay, N. Y. tf

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J. STEFFENS, 57 East Twenty-second st., Chicago. tf

Wanted.

Ship yard rolls to take in 20 feet length. Wire price and particulars to

POLSON IRON WORKS,

Nov. 26. Toronto, Canada.

Proposals for the Improvement of the Port of Iloilo, P. I.—Sealed proposals in triplicate will be received until noon, February 1, 1904, and thereafter publicly opened for the following work to be done at Iloilo, P I , or as much thereof as may be completed for the sum of $150,000 U S currency. The construction of 6,100 lineal feet of dike or fascine bank protection composed of piles mattresses and stone. The dredging of 4'0 000 cubic yards of material in the river channel and the depositing of the material back of the dikes. Envelopes containing proposals should be plainly marked "Proposals for the Improvement of the Port of Iloilo, P.I." Plans, specifications and contracts can be obtained and examined at this office or at the U. S Engineer's offices at New York, Chicago, San Francisco and Portland, Oregon; also at the Bureau of Insular Affairs, Washington D C. Bidders are invited to be present at 4 p m., February 1, 1904, when bids for the work as a whole will be opened Address all communications to the Consulting Engineer to the Commission, Santa Potenciana Building, Manila, P.I. J. W BEARDSLEY, Consulting Engineer to the Commission. Dec. 24

Proposals for the Improvement of the Port of Cebu, P.I —Sealed proposals in triplicate will be received until noon, February 1, 1904 and thereafter publicly opened for the following work to be done at Cebu, P I. The construction of a bulkhead and dock about 2,600 feet long, the dredging of the channel adjacent to said bulkhead, and the filling in of the area immediately back of the same, or so much thereof as may be completed for the sum of $350,000 U S currency Envelope containing proposal should be plainly marked "Proposal for the Improvement of the Port of Cebu." Plans and specifications can be obtained and examined at this office or at the U.S Engineer's offices at New York, Chicago, San Francisco and Portland, Oregon; also at the Bureau of Insular Affairs, Washington, D.C Bidders are invited to be present at 4 p.m , February 1, 1904, when bids for the work as a whole will be opened. Address all communications to the Consulting Engineer to the Commission, Santa Potenciana Building, Manila, P.I. J. W. BEARDSLEY, Consulting Engineer to the Commission. Dec. 24

PITTSBURGH WHITE METAL CO.

MANUFACTURERS OF THE BEST

BABBITT and ANTI-FRICTION

Metals

Known for any Purpose.

Made from the Best Materials.

Price and Quality Guaranteed and Always Consistent with the Market.

PITTSBURGH, - PA.

Generated on 2024-08-27 16:10 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

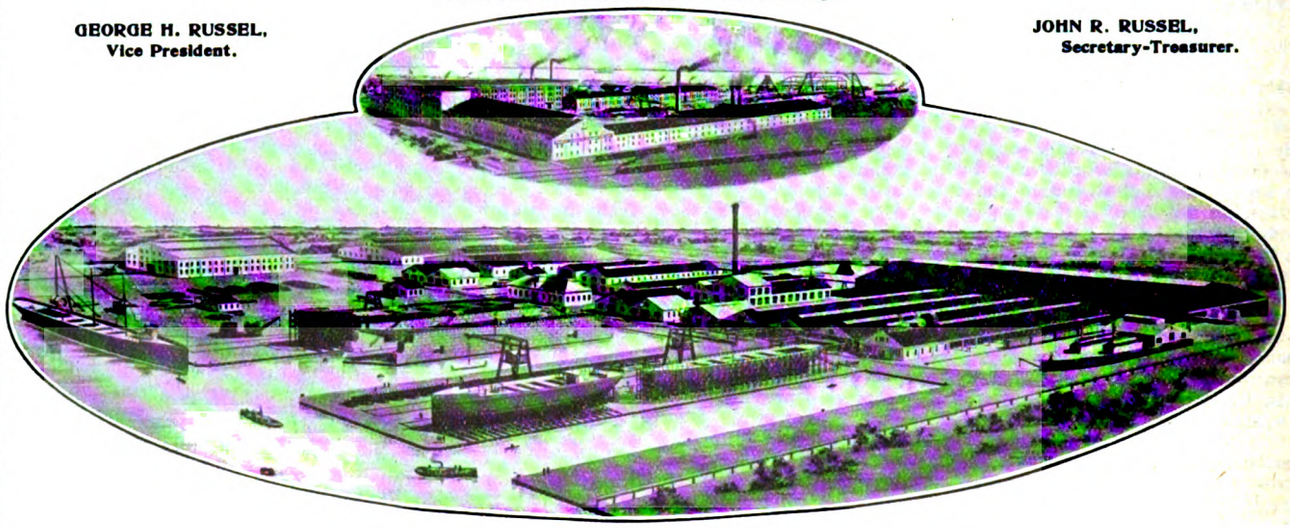
GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

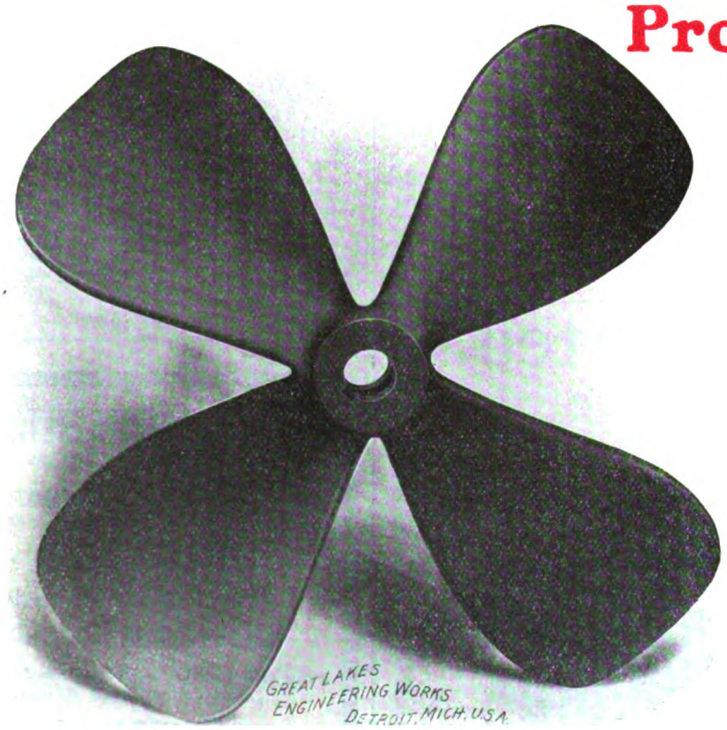
ANTONIO C. PESSANO, Pres. and Gen. Mgr.

GEORGE H. RUSSEL, Vice President.

JOHN R. RUSSEL, Secretary-Treasurer.



Steel Ship Builders
Floating Dock
Marine Engines
Marine Repairs
Hydraulic Dredges
Hydro Carbon System
Propeller Wheels



Semi-Steel Propeller Wheels

made either Solid or improved Sectional Type. Our Wheels possess many points of merit not found in other makes.

Quick deliveries guaranteed.

Generated on 2024-08-27 16:03 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. 1903 edition. $2.25.

DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8¾ in. by 5 in., cloth. $1.50.

ELECTROMAGNETIC PHENOMENA AND THE DEVIATIONS OF THE COMPASS—Com. T. A. Lyons. $6.

ELEMENTARY SEAMANSHIP—by Barker. New and enlarged edition. $2.50.

ELEMENTS OF NAVIGATION—Henderson. $1.

HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes. $3.75.

HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg. $1.75.

ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson. $3.

INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New edition. $3.

KNOW YOUR OWN SHIP—Thos. Walton. $2.50.

MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises. $1.50.

MARINE INSURANCE—W. Gow. $1.50.

MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently—J. W. Dixon. $1.

MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations. $1.25.

MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy. $6.

MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. Two volumes. Second edition, revised and enlarged. $5.25.

NAVAL ARCHITECTURE: A treatise on laying off and building wood, iron and composite ships.—Samuel J. P. Thearle. In two volumes. $3.

NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels—Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards. $5.

NAVAL ARCHITECTURE—Sir W. H. White. New edition. 750 pages. $9.

NAVAL ARCHITECTS AND SHIPBUILDERS' POCKET BOOK—Clement Mackrow. Formulae, rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged. $5.

NAVIGATION SIMPLIFIED—C. E. McArthur. Containing all problems required for U. S. Local Inspector's Examination of Masters and Mates of seagoing vessels. $1.

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. $3.

PRACTICAL COMPASS ADJUSTMENT on Iron, Composite and Wooden Vessels. Illustrated.—Capt. W. J. Smith. $2.

PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron Ships—J. T. Towson. $2.

PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship, Wreck Lifting, Avoiding Collision, Wire Splicing, Displacement, and everything necessary to be known by seamen of the present day. Second edition, illustrated.—John Todd and W. B. Whall. $8.40.

RESISTANCE AND PROPULSION OF SHIPS—Durand. $5.

SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean-going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound. $2.

SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION—Earl of Dunraven. Two volumes. $7.

SHIP BUILDING—Tables for constructing ship's lines. Second edition. Archibald Hogg. $2.

SIMPLE ELEMENTS OF NAVIGATION—Young. New second edition. $2.

STABILITY OF SHIPS—Sir E. J. Reed. $8.40.

STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship superintendents, students and marine engineers—Thos. Walton. $5.50.

TEXT BOOK OF NAVAL ARCHITECTURE—J. J. Welch. $1.50.

TEXT BOOK OF SEAMANSHIP—Com. S. B. Luce, U. S. N. Equipping and handling of vessels under sail or steam. $10.

THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design—Samuel J. P. Thearle. In two volumes. $3.50.

THEORETICAL NAVAL ARCHITECTURE—E. L. Attwood. Text book; 114 diagrams. $2.50.

"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky. $8.40.

YACHT ETIQUETTE—Capt. Howard Patterson. $1.

Books on Marine Engineering, or the Operation of Engines, and for Beginners in the Engine Room.

AMERICAN MARINE ENGINEER—By Edwards. $2.50.

ARITHMETIC OF THE STEAM ENGINE—E. S. Gould. $1.

ELECTRIC LIGHTING—Atkinson. $1.50.

ELECTRIC LIGHTING FOR MARINE ENGINEERS; or, How to light a ship by the electric light and how to keep the apparatus in order—S. F. Walker. $2.

ENGINEER'S EPITOME—N. J. Smith. A collection of figures, facts and formulae for engineers. 50 cents.

ENGINEER'S MANUAL OF LOCAL MARINE BOARD EXAMINATIONS—By Ainsley. $5.

ENGINES AND ENGINE RUNNING—Joshua Rose. For the use of those who desire to pass an examination to take charge of an engine or boiler; illustrated. $2.50.

EXAMINATION QUESTIONS AND ANSWERS—Emory Edwards. 900 examination questions and answers for young engineers and firemen who desire to obtain marine licenses. $1.50.

GAS, GASOLINE AND OIL ENGINES. Gardner D. Hiscox. $2.50.

HAWKINS' AIDS TO ENGINEERS' EXAMINATIONS, with Questions and Answers. $2.

HAWKINS' SELF-HELP, Mechanical Drawing. $2.

HAWKINS' NEW CATECHISM OF ELECTRICITY. $2.

HAWKINS' MAXIMS AND INSTRUCTIONS FOR THE BOILER ROOM. Useful to the engineer, the fireman, to the steam user or owner, and to the student of steam engineering. $2.

HAWKINS' HAND BOOK OF CALCULATIONS FOR ENGINEERS. Comprises elements of arithmetic, mensuration, geometry, mechanical philosophy, with explanations and help rules useful to an engineer. $2.

HAWKINS' NEW CATECHISM OF THE STEAM ENGINE. $2.

HAWKINS' INDICATOR CATECHISM. (A practical treatise.) $1.

HOW TO RUN ENGINES AND BOILERS. Practical instruction for young engineers and steam users. E. P. Watson. New fifth edition. $1.

INDICATOR PRACTICE—Hemenway. $2.

KEY TO ENGINEERING—Invaluable to engineers and firemen about to take examinations. Written in the plainest language and in the form of questions and answers. Postpaid, 75 cents.

KEY TO ENGINES AND ENGINE RUNNING—Joshua Rose. For use of those desiring to pass examination to take charge of an engine or boiler. $2.50.

LESSONS AND PRACTICAL NOTES ON STEAM, THE STEAM ENGINE, PROPELLERS, ETC.—King. $2.

LIBRARY OF STEAM ENGINEERING—John Fehrenbatch, M. E. $5.

MARINE BOILERS: A treatise on the Causes and Prevention of their Priming, with remarks on their general management—Reed. $2.

MARINE BOILERS—Stromeyer. $5.

MARINE BOILERS—L. E. Bertin. 250 illustrations, designs and tables. $7.50.

MARINE ENGINES—R. Murray. $1.80.

MARINE PROPELLERS—By Barnaby. $4.50.

MARINE STEAM ENGINE: Its Construction, Action and Management—Carl. Busley. A manual and book of reference for engineers, students, ship owners, officers of the navy and mercantile marine, and all interested in steam navigation. Thoroughly revised; third edition. $15.

MARINE STEAM ENGINES—Sennet & Oram. $6.

MECHANICS' AND ENGINEERS' POCKET BOOK, including Naval Architecture, Steam and the Steam Engine, Steam Vessels, etc. 64th edition, 1050 pages. Chas. H. Haswell. $4.

MECHANICAL ENGINEERS' POCKET BOOK—Wm. Kent. Reference book or rules, tables, etc. $5.

MODERN EXAMINATIONS OF STEAM ENGINEERS—W. H. Wakeman. $2.00.

NAUTICAL ENCYCLOPEDIA, ILLUSTRATED—Howard Patterson. Complete from Standpoint of Marine Engineer and Naval Architect. $3.

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. $3.

PRACTICAL MARINE ENGINEERING, for marine engineers and students with aids for applicants for marine engineers' license—Prof. W. F. Durand. $5.

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Theo. Lucas. Containing 807 questions, with fully explained illustrated answers. $2.

QUESTIONS AND ANSWERS, sixth edition—Stephen Roper. $2.

REED'S ENGINEERS' HAND BOOK—New edition; illustrated by 345 diagrams and 36 large plates. $5. 45 cents extra by mail or express.

REED'S KEY to Reed's Hand Book—Contains working of all questions given in examination papers. $3.

RESISTANCE AND PROPULSION OF SHIPS—W. F. Durand, principal of school of marine construction, Cornell University. $5.

ROPER'S ENGINEERS' HANDY BOOK for Steam Engineers and Electricians. Revised and enlarged. $3.50.

SCREW PROPELLER COMPUTER—Prof. Geo. R. McDermott. For quickly determining dimensions and proportions of screw propeller or any set of conditions. $5.

SCREW PROPELLERS AND MARINE PROPULSION—I. McKim Chase. $3.00.

SLIDE VALVE—Julius Begtrup. Special reference to Modern Practice in the United States. $2.

SLIDE VALVE, SIMPLY EXPLAINED—W. J. Tennant. $1.

SLIDE VALVES—C. W. MacCord, Jr. A book for practical men on the principles and methods of design. $2.

SMALL ENGINES AND BOILERS—Egbert P. Watson. A manual of concise and specific directions for construction of small steam engines and boilers of modern types; illustrated. $1.25.

STEAM AND THE MARINE STEAM ENGINE—Jno. Yeo. $2.50.

STEAM BOILERS—Joshua Rose. Practical treatise, construction and examination. Seventy-three engravings. $2.50.

STEAM BOILER: Its Care and Management. Stephen Roper. $2.

STEAM ENGINE: Theory and Practice—Ripper. $2.50.

TRIPLE AND QUADRUPLE EXPANSION ENGINES AND BOILERS AND THEIR MANAGEMENT—A. Ritchie Leask. Third edition, revised. $2.

WATER TUBE BOILERS—Fifth revised and enlarged edition of HOW TO RUN ENGINES AND BOILERS—F. P. Watson. Practical instruction for young engineers and steam users. $1.

SENT TO ANY ADDRESS CARRIAGE PREPAID, AT PRICES NAMED.

There is no book on Navigation, Marine Engineering, Ship Building, or the allied industries that is not either published or for sale by

The Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, Ohio.

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

REPORT OF ELEVENTH ANNUAL MEETING, SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS.

NEW YORK PUBLIC LIBRARY
TILDEN FOUNDATIONS
LENOX

MARINE REVIEW
AND MARINE RECORD.

WEEKLY.] [ESTABLISHED, 1878.

VOL. XXVIII. CLEVELAND, O., NOV. 26, 1903. No. 22.

Detroit White Lead Works

DETROIT VARNISH COMPANY,

Manufacturers of Paints, Varnishes and specialties specially prepared for marine use.

DETROIT, CHICAGO, BUFFALO and CLEVELAND

THE WM. CRAMP & SONS Ship and Engine Bldg. Co., Philadelphia.

BRASS FOUNDRY

PARSONS MANGANESE BRONZE. PARSONS WHITE BRASS.

Propeller Castings of All Kinds a Specialty.
Castings and Ingots for Marine and Land Purposes of High Tensile Strength and Best Composition.

EDWARD W. HYDE, Pres. H. H. McCARTY, Treas.
JOHN S. HYDE, Vice-Pres. and Gen. Supt.

BATH IRON WORKS, Ltd.

Ship Builders and Engineers.

BATH, MAINE.

W. L. BROWN, Pres.
JAS. C. WALLACE, Vice-President and General Manager.
R. C. WETMORE, Sec'y and Treas.

DRY DOCKS IN CLEVELAND.
No. 1, foot Weddell St., 547 ft. x 65 ft. x 15 ft 6 in.
No. 2, foot Weddell St., 450 ft. x 50 ft x 16 ft.
No. 3, Elm St., 340 ft. x 50 ft. x 13 ft.
Dry Dock at Lorain, 560 ft. x 60 ft x 17 ft.

The American Ship Building Co.

OFFICE, 120 VIADUCT, CLEVELAND, O.

STEEL SHIPS

Marine and Stationary Engines.
Boilers and Auxiliary Machinery.

Sole Agents for the Lakes for the Ellis & Eaves Induced Draft System, as applied to boilers, giving increased power and great economy.

Prompt Attention Given to Ship Repairs of all Kinds.

WORKS AT CLEVELAND AND LORAIN.

PHOSPHOR BRONZE

REG. TRADE MARKS

"Phosphor Bronze" DELTA

THE PHOSPHOR BRONZE SMELTING CO. LIMITED.
2200 WASHINGTON AVE., PHILADELPHIA.
"ELEPHANT BRAND PHOSPHOR-BRONZE"
INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.
—DELTA METAL—
CASTINGS, STAMPINGS AND FORGINGS.
ORIGINAL AND SOLE MAKERS IN THE U.S.

DELTA METAL

Pintsch Gas Lighted Buoys

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1700 gas buoys and gas beacons in service.

Burn Continuously from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and Steady Illumination.
Economical and Reliable in Operation.

Controlled by the SAFETY CAR HEATING and LIGHTING CO.
160 Broadway, New York City.

ALEXANDER McVITTIE, President and Manager. CHARLES B. CALDER, General Superintendent. M. E. FARR, Secretary and Treasurer.
WILLIAM C. McMILLAN, Vice-President. FRANK E. KIRBY, Consulting Engineer.

DETROIT SHIPBUILDING COMPANY,

SHIP AND ENGINE BUILDERS, DETROIT, MICH.

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM as applied to Boilers, giving increased power and great economy.

Steel Ship Yard Located at Wyandotte, Mich.
Wooden Ship Yards and Dry Docks, Foot of Orleans Street, and Foot of Clark Ave., DETROIT, MICH.

AMERICAN

THOMPSON IMPROVED INDICATOR with NEW DETENT MOTION.

DO NOT let this IMPROVEMENT ESCAPE YOUR ATTENTION.

SEND AT ONCE FOR CATALOG | INDICATORS THAT INDICATE GAUGES THAT GAUGE POPS THAT POP

AMERICAN STEAM GAUGE & VALVE MFG. CO.

NEW YORK. BOSTON. CHICAGO.

LUCK WITH EACH CAN

BERTRAM'S POLISH

For TWENTY Years the **Standard of Excellence.**

Can be brightened next day by merely rubbing with DRY CLOTH. Every can contains lucky coin. Will bring LUCK IN EACH RACE.

Used on all CUP DEFENDERS

THE MARINE POLISH OF THE WORLD. AGENTS WANTED IN ALL LARGE CITIES.

A Sample of Bertram's Oil Polish mailed FREE OF CHARGE on request.

BERTRAM'S OIL POLISH CO., BOSTON, MASS.

Generated on 2024-08-27 15:59 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

THE BROWN HOISTING MACHINERY CO. INCORPORATED

Sole makers of the "Brownhoist" High Speed Cantilever and Gantry Cranes. The most economical cranes for covering large areas in steel works or ship yards.

Machinery For Handling Structural Work, Marine Plates, etc., in Ship Building Yards.

Coal and Ore Handling Machinery.

Cranes of all Types. Steam, Electric and Hand Power.

Main Office and Works, CLEVELAND, O., U. S. A.

Eastern Office, 26 Cortlandt St., New York City. Pittsburg Office, Carnegie Building, Pittsburg, Pa. European Office, 39 Victoria St., London, S.W.

"CLAM SHELL" BUCKETS FOR IRON ORE.

HULETT PATENTS

The Wellman-Seaver-Morgan Co.
BUILDERS.
Complete Coal and Ore Handling Plants.
CLEVELAND, O.

WE CONVEY AND ELEVATE EVERYTHING.
TACKS, SAND, ROCK, ORES, RED HOT IRON, MOLTON SLAG, COAL AND SALT.
CONVEYORS AND ELEVATORS MADE BY
THE C.O. BARTLETT & SNOW CO.
CLEVELAND. O.

We have now fitted up three fueling scows which are now in successful operation on the lakes for fueling vessels.

Send for full description.

Questions and Answers for Marine Engineers.
By Theo. Lucas.
Sent postpaid to any address for $2.00.
Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

GENERATORS ELWELL-PARKER ELECTRIC CO. OF AMERICA MANUFACTURERS GUARANTEES QUALITY CLEVELAND, OHIO. MOTORS

Standard Marine Generating Sets. * * * *Complete Hoisting and Power Plants.*

Established 1857.

AMERICAN SHIP WINDLASS CO.

PROVIDENCE, R. I.

SHIP MACHINERY EMBODYING THE LATEST DESIGNS AND MANY IMPORTANT PATENTED IMPROVEMENTS.

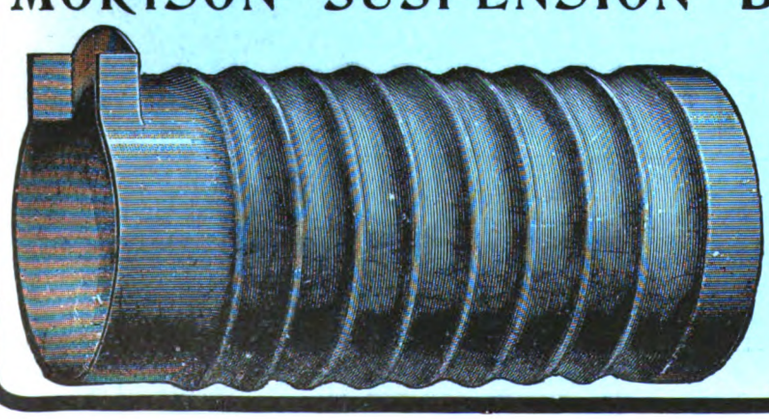
SOLE BUILDERS OF THE

Original and Only Automatic Steam Towing Machine.

SEND FOR ILLUSTRATED CATALOGUE.

P. O. BOX 53. **Address: FRANK S. MANTON, President.**

MORISON SUSPENSION BOILER FURNACES



FOR LAND AND MARINE BOILERS.

UNIFORM THICKNESS—EASILY CLEANED
UNEXCELLED FOR STRENGTH.

Also Fox Corrugated Furnaces.

MANUFACTURED BY

THE CONTINENTAL IRON WORKS,

West and Calyer Sts., NEW YORK.

Near 10th and 23d Sts. Ferries. Borough of Brooklyn.

Generated on 2024-08-27 16:04 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

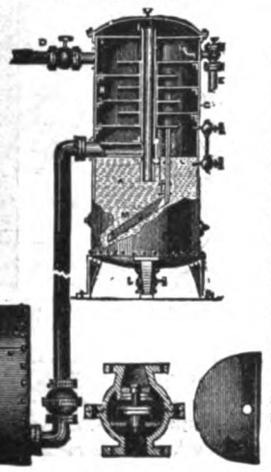
Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

Keep Your Boilers Clean By Using CLEAN WATER.

The "BUFFALO" is Warranted to Remove all Sediment and Scale Forming Substance.

THE BUFFALO FEED WATER HEATER AND PURIFIER.



The undersigned has the agency of a number of meritorious steam specialties for use on steam vessels, all of which are guaranteed to be what they are represented, and which he is prepared to furnish at a low rate. I am also prepared to superintend the making of alterations and repairs on steam vessels or power plants, at a reasonable cost, and would respectfully solicit your patronage, to which prompt and personal attention will be given.

ROBERT LEARMONTH, Patentee,

100 WHITE BUILDING, BUFFALO, N. Y.

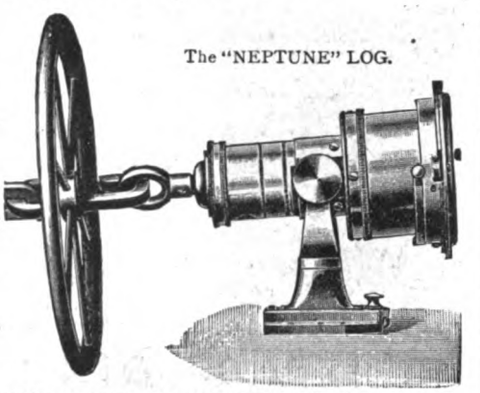
THOMAS WALKER & SON,

BIRMINGHAM, ENGLAND.

THE "NEPTUNE" SHIP-LOG With Ball Bearings for HIGH SPEEDS.

Also makers of the "CHERUB" and "HARPOON" SHIP-LOGS.

The "NEPTUNE" LOG.



MAKERS TO THE BRITISH NAVY.

H. A. J. HELVIG.

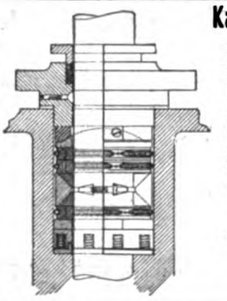
MANUFACTURER OF

SHIP LANTERNS and LAMPS.

Carried in stock by the leading ship chandlers, who are in a position to make prompt delivery at bottom prices, also

Side Lights, Bow Lights,
Anchor Lights, Launch Lights,
Binnacle Lamps, Cabin Lamps,
Hand Lamps, Etc.

228 PEARL STREET, NEW YORK.



Katzenstein's Self-Acting Metal Packing.

For PISTON RODS, VALVE STEMS, etc., of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries. FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints. For full particulars and reference, address:

L. KATZENSTEIN & CO.,

General Machinists, Brass Finishers, Engineers' Supplies,

358 WEST ST., NEW YORK.

British Admiralty Charts

The latest Editions of Charts, Plans and Sailing Directions Published by the British Admiralty. ⚓⚓ Can be obtained from Admiralty Agent by Appointment.

J. D. POTTER,

145 MINORIES, LONDON, ENGLAND.

OFFICIAL CATALOGUE OF CHARTS (380 pages) 1s.

An Abridged Catalogue of Charts of Nautical Books (free on application.)

AMERICAN LINE

NEW YORK SOUTHAMPTON LONDON

CALLING AT CHERBOURG WESTBOUND.

Sailing From New York Every Saturday at 9:30 a. m.

ST. LOUIS (11,629 tons), ST. PAUL (11,629 tons), NEW YORK (10,674 tons), PHILADELPHIA (10,433 tons)

Special Express Train from Southampton to London in one hour and forty minutes. Close connection at SOUTHAMPTON for Havre and Paris by special fast twin-screw Channel Steamers.

RED STAR LINE

NEW YORK ANTWERP PARIS

Sailing Every Saturday at 10:30 A. M.

FINLAND (12,760 tons), KROONLAND (12,760 tons), ZEELAND (11,905 tons), VADERLAND (11,899 tons).

One of the Shortest Routes to BELGIUM, HOLLAND, FRANCE, GERMANY, THE RHINE, SWITZERLAND and ITALY.

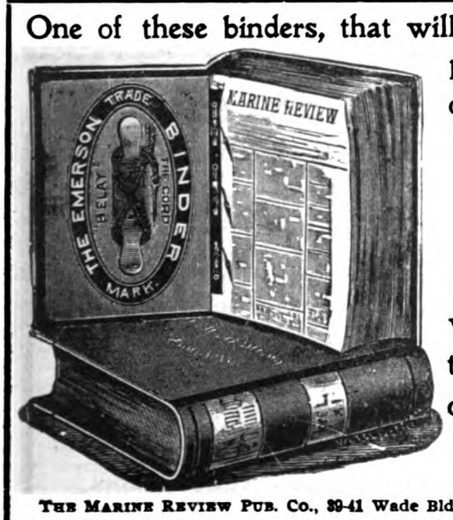
Send for "Facts for Travelers."

Office, Empire Building 73 Broadway, New York.

305-307 Walnut St., Philadelphia.
Fiske Building, 89 State Street, Boston.
1306 F St., N. W., Washington, D. C.
90-96 Dearborn St., Chicago.
Century Building St., Louis.
Guaranty Building, S., Minneapolis.
21 Post St., San Francisco.

PIERS: 14 & 15 NORTH RIVER, FOOT OF FULTON ST., NEW YORK.

One of these binders, that will hold a complete volume of the



Marine Review

and Marine Record,

will be mailed to any address on receipt of

$1.

THE MARINE REVIEW PUB. CO., 39-41 Wade Bldg. CLEVELAND, O.

Steel Works and Rolling Mill Engineers

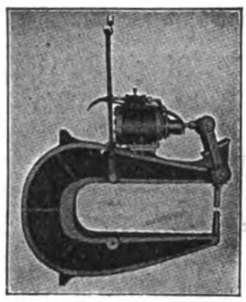
Garrett-Cromwell Engineering Co.

WILLIAM GARRETT, Manager.

New England Building, Cleveland, O.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

ALLEN PORTABLE PNEUMATIC RIVETING MACHINES

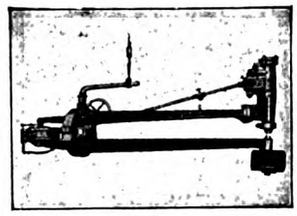


The following concerns are using our machines:

United States Navy Yard, Bremerton, Wash.

United States Navy Yard, Portsmouth, N. H.

United States Navy Yard, Mare Island, San Francisco, Cal.



Brown Hoisting Machinery Co., Cleveland, O.

New York Ship Building Co. Camden, N. J.

Wm. R. Trigg Co. Richmond, Va.

Canadian Ship Building Co. Bridgeburg, Ont.

CABLE ADDRESS, "RIVETERS" W. U. Code

ESTABLISHED 1872

JOHN F. ALLEN, 370-372 Gerard Ave., NEW YORK

The United States Shipbuilding Company

43 Cedar Street, New York

Builders of all Types of Vessels

The only Company in the world that can

BUILD, EQUIP, ARM AND ARMOR A Modern Battleship

without calling upon outside assistance

CAN MAKE AGREEMENTS COVERING REPAIRS OR BUILDING ON

Atlantic and Pacific Oceans

HARDY'S S.S. METAL.

THE MOST DURABLE AND SATISFACTORY BABBITT METAL FOR MARINE SERVICE

TRADE MARK W HARDY - S.S. METAL -

FACSIMILE OF INGOT

HAS STOOD THE TEST OF 30 YEARS.

MANUF'D SOLELY BY WM. A. HARDY. FITCHBURG, MASS. U.S.A.

PATTERSON'S NAUTICAL ENCYCLOPEDIA. PRICE, $3.00

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

THE MARINE REVIEW PUB. CO., CLEVELAND.

Fogg's Resilent Felt Matresses and Cushions.

Manufactured By.

M. W. FOGG,

202 Front St. N. Y.

Send for Illustrated Catalogue.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Streets, Hoboken, N. J.

Take Ferry from foot of West 14th St., N. Y.

Phone Call 340 B. Greenpoint.

LANE & DeGROOT.

METALLIC LIFE BOATS. (Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers, etc., approved by the U. S. Supervising Inspectors. Also Wood Boats of every description. Repairing of every kind promptly attended to.

305-315 Vernon Ave., Long Island City, N. Y.

Neversink Cork Jackets and Life Belt.

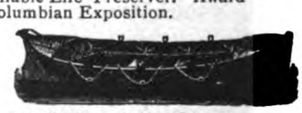
Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

Consolidated Cork Life Preservers. Ring Buoys and Fenders.

SAFEST. CHEAPEST.

Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.

METALLIC and WOODEN LIFE BOATS.



Metallic Life Rafts. Marine Drags.

Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

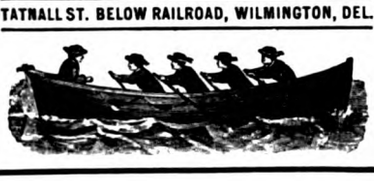
DAVID KAHNWEILER'S SONS.

437 Pearl Street, New York City.

Send for Illustrated Catalogue.

THOS. DREIN & SON.

TATNALL ST. BELOW RAILROAD, WILMINGTON, DEL.



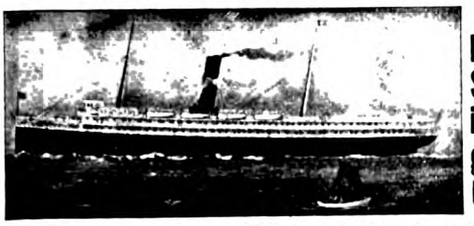
BUILDERS OF METALLIC LIFE BOATS AND RAFTS, YACHTS AND PLEASURE BOATS.

LIFE PRESERVERS.

OUTFIT FOR LAKE STEAMERS A SPECIALTY.

Generated on 2024-08-27 15:52 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

ROACH'S SHIP YARD.



Delaware River Iron Ship-Building & Engine Works Chester, Pa.

Builders of Steamships and Marine Machinery.

SHIP-BUILDING IN ALL ITS BRANCHES.

NEW YORK OFFICE, MORGAN IRON WORKS Foot E. Ninth St.

MARINE CONSTRUCTION AND DRY DOCK COMPANY of New York.

Steel and Wood Vessels, Yachts, Tugs, Life Boats and Tenders.

Send Specifications and enquiry to—Works: Mariner Harbor, (S. I.) N. Y. Telephone, 133 West Brighton.

New York Office, 1023 Maritime Building. Telephone, 3346 Broad

Fore River Ship and Engine Co.

Successors to Fore River Engine Co.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
U. S. Protected Cruiser Des Moines.
U. S. Battleships New Jersey and Rhode Island.
U. S. Steam Light-Vessel No. 72.

OFFICE AND WORKS, QUINCY, MASS. U. S. A.

The Atlantic Works,

Builders of Steamships, Steam Yachts, Tow Boats Etc

EAST BOSTON MASS.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Work
Three Marine Railways.

MARYLAND STEEL CO.

Marine Department,

Ship Builders and Engineers

SPARROW'S POINT, MD.

Baltimore Telephone No. 11 - - - A. G. WILSON, Manager.
Long Distance Telephone Service Between New York, Philadelphia, Boston and Sparrow's Point Offices.
New York Office: 71 Broadway. Boston Office: 70 Kilby Street.
Philadelphia Office: 312-319 Girard Building.

Risdon Iron Works

Build STEEL AND IRON SHIPS

MARINE WATER TUBE BOILERS, ENGINES

Works—Potrero. Office—Steuart & Folsom Sts.
SAN FRANCISCO, CAL.

THE LOCKWOOD MANUFACTURING CO.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of STEAMSHIPS, TOW BOATS and MARINE ENGINES
REPAIRING OF HULLS AND MACHINERY.

The Allen Dense-Air Ice Machine

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers.

A HUNDRED ARE IN DAILY SERVICE ON STEAMERS.

H. B. ROELKER, 41 Maiden Lane, NEW YORK

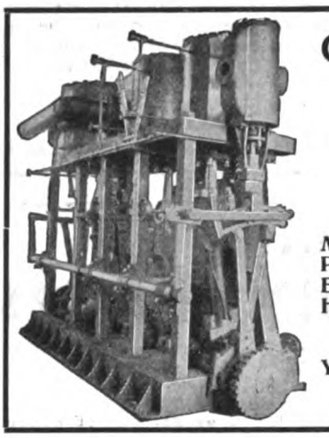
Consulting and Constructing Engineer. Designer and Manufacturer of Screw Propellers.

MANITOWOC DRY DOCK COMPANY

SHIP BUILDERS

Facilities for Repairs to Steel and Wooden Vessels.

DRY DOCKS AND MAIN OFFICE: MANITOWOC, WIS.
BRANCH YARD: 34 ROBERTS STREET, CHICAGO.



Chas. P. Willard & Co.,

F. C. WALTER, MANAGER,
30 W. Randolph St.,
CHICAGO.

Builders of

Marine Engines and Boilers,
Paddle Wheel Engines,
Boat Machinery,
High Pressure, Compound and Triple Expansion Engines,
Yachts and Launches.

Write for Catalogue.

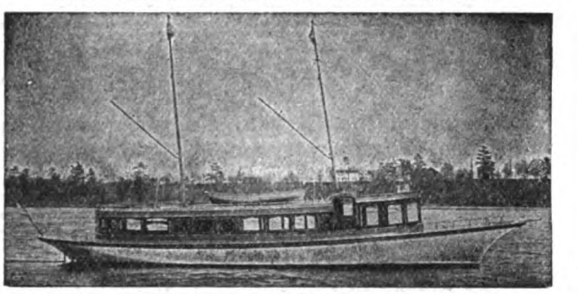
WARRINGTON IRON WORKS,

Builders of STEAM YACHTS, TOW BOATS and LAUNCHES.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Works.

Foot of West Wellington St., CHICAGO, ILLINOIS.

A TRUSCOTT BOAT.



SIMPLE. SAFE. SPEEDY. RELIABLE.

It may be possible to build better and safer boats but it hasn't been done yet. We send a completely illustrated catalogue and price list free, which tells you all about boats and why Truscott Boats Excel.

TRUSCOTT BOAT MFG. CO. ST. JOSEPH, MICH.

Newport News Shipbuilding AND Dry Dock Co.

SHIP and ENGINE BUILDERS.

Equipped with two large basin dry docks of the following dimensions:

	No 1	No 2
Length on top	610 ft	827 ft
Width on top	130 ft	162 ft
Width on bottom	50 ft	80 ft
Draught of water over sill	25 ft	30 ft

Shops are equipped with modern machinery capable of doing the largest work required in ship construction.

Tools driven by electricity and compressed air used in constructing and repairing vessels.

For estimates and further particulars, address

C. B. ORCUTT, President.

No. 1 BROADWAY, NEW YORK.

Works at Newport News, Va. (On Hampton Roads.)

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

MacLean Hydraulic Signal

Best Engine Room Telegraph.

Simple, Powerful, Easily Operated, Sure and Reliable. Last Signal recorded if engineer misunderstands or does not obey signal promptly.

Will not get out of order and needs no readjustment after installing. Can be easily installed. We have whistle and steering signals also for use at either end of the boat; extremely useful and convenient when backing down. For full particulars and illustrations address:

MacLean Hydraulic Signal Co.
Pontiac Bldg., Harrison and Dearborn Sts., CHICAGO.

MARINE CHAIN

OF ALL KINDS.

Ships Cables, Dredge Chains,
Stud Link and Marine Railway Chains,
Steam Shovel Chains, Boom Chains, Etc.

CERTIFICATE OF TEST FURNISHED.

STANDARD CHAIN CO.

PITTSBURGH, PA.

Buffalo
Wrought Steel Ranges
Are the Best.

Steamboat and Barge Ranges with Rotary Grates.
No Cog Wheels to Warp or get out of order.

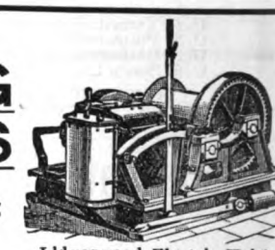
Don't take our word for it but ask some one using them.

Russell & Watson, BUFFALO, N. Y.
General Steamboat Work Send for Catalogue.

AGENTS—Topky Bros., Ashtabula Harbor, Ohio.
H. C. Weber & Co., Detroit, Mich.
John Black, So. Chicago, Ill.
Pritzlaff Bros., Milwaukee, Wis.

Lidgerwood
HOISTING ENGINES

OVER 21,000 IN USE.



Lidgerwood Electric Hoist

ELECTRIC HOISTS
Specially adapted for Docks, Warehouses and Steamships.

LIDGERWOOD MILLER MARINE CABLEWAY
will transfer Coal, Ammunition Supplies, etc. from ship to ship at sea.

SEND FOR CATALOGUE.

LIDGERWOOD MFG. CO. 96 LIBERTY STREET, NEW YORK.

The LITTLE RED BOOK
for 1903 WILL TELL YOU

The name of the Captain, Engineer and Owner of about 2000 vessels of the Great Lakes.

A new list in the book this year shows the capacity in iron ore of every vessel that is suited to carrying iron ore. This ore capacity list is made up from averaging all cargoes for 1902.

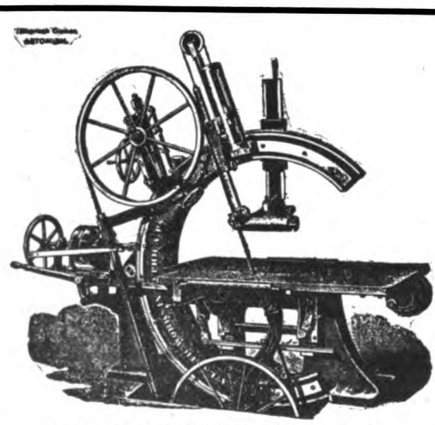
It can be carried in the vest pocket or placed in the pigeon hole of a desk.

SENT ON APPROVAL

Price $1.00

MARINE REVIEW PUB. CO.,
39-41 Wade Building,
CLEVELAND, O.

Geo. Stratford Oakum Co.
JERSEY CITY, N. J.
ESTABLISHED 1860
Manufacturers of all grades of
OAKUM.
Spun Cotton.
For sale at Ship Chandlers everywhere.



ADJUSTABLE BEVEL BAND SAW.
Will bevel both ways to 45 degrees.
Power Movement to change angles.
Power feed in three directions.

ESTABLISHED 1869. INCORPORATED 1896.

ATLANTIC WORKS INCORPORATED,

Successors to Berry & Orton Company.

2223-25-27-29 Arch St., Philadelphia, Pa., U.S.A.

MANUFACTURERS OF

MACHINERY FOR WORKING WOOD

FOR USE IN

Ship Yards, Car Shops, Railroad Shops.

SEND FOR CATALOGUE. ESTIMATES FURNISHED.

Hollow Chisel Mortisers. Car Sill Dressers.

Generated on 2024-08-27 15:52 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

SIPE'S No JAPAN OIL TRADE MARK REGISTERED J.B. SIPE & CO. MANUFACTURERS. ALLEGHENY, PA.

SIPE'S JAPAN OIL

SUPERIOR TO LINSEED OIL FOR ALL KINDS OF PAINTING

Cheaper and more durable—Does not require the addition of Dryers, and is not affected by sulphur, or salt water.

OUR LINE OF **BLACK PAINTS**

FOR PAINTING STACKS, CYLINDERS AND HULLS

are widely used and highly esteemed. (Prices and samples furnished on application.)

JAS. B. SIPE & CO. SOLE MANUFACTURERS ALLEGHENY, PA., U.S.A.

BETTER and More ECONOMICAL than DRILLED BOLTS.

FALLS HOLLOW STAYBOLTS. ANY SIZE OUTSIDE OR INSIDE DIAMETER. AVERAGE LENGTH OF HOLLOW BARS EIGHT TO TEN FEET. BOTH HOLLOW AND SOLID. MADE OF BEST QUALITY DOUBLE REFINED CHARCOAL IRON OR STEEL. FALLS HOLLOW STAYBOLT Co CUYAHOGA FALLS, O. U.S.A.

FALLS HOLLOW BOLTS are self-inspectors. Afford protection against explosions. Are of uniform strength and flexibility. Hole is central, admits air, which aids combustion. Superior quality guaranteed. Samples of either Hollow or Solid furnished on application. Ask for our latest price list.

The
Self Instructor in Navigation
and
Practical Guide to the Examinations of the U. S. Government Inspectors
for
Masters and Mates of Ocean Going Steamships and Sailing Vessels,
With Illustrations.

SECOND EDITION. REVISED AND ENLARGED.
By CAPT. W. J. SMITH.

Price, Postpaid,
$2.00

For Sale by
The Marine Review Pub. Co.,
39-41 Wade Bldg., Cleveland, O.

IF IT WERE A FACT

which, under proper conditions, it is not, that white lead covers better than ZINC WHITE; still in view of its greater spreading power and greater durability,

ZINC WHITE

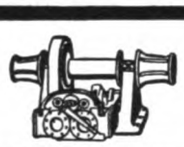
WOULD BE BY FAR THE MORE ECONOMICAL PAINT. Any high grade combination paint based on ZINC WHITE will cover more area, pound for pound, than the best white lead, will cover this area equally well, will cover it more pleasingly and more economically and will keep it effectively covered much longer. One does not need to go beyond the facts in possession of any paint manufacturer to prove that ZINC WHITE is the vital element in successful paint making.

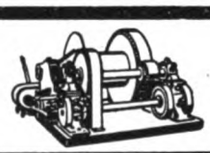
THE NEW JERSEY ZINC CO.
71 Broadway, - - NEW YORK.

FREE, Our Practical Pamphlets:
"The Paint Question." "Specifications for Architects."
"Paints in Architecture." "French Government Decrees."
"House Paints: A Common Sense Talk About Them."

We do not grind zinc in oil. List of manufacturers of Zinc White Paints will be furnished on request.

CRANE FITTINGS





GASOLENE MARINE ENGINES
Suitable for all Boats from 3½ to 200 H.P.
Over 100 in successful use.
Also the well known and always reliable Woolters Gas or Gasolene Stationary Engines.

HOISTING ENGINES
Of all kinds and sizes, and for all purposes, especially for ship use.
Docking and Hauling Engines and Wire Rope Windlasses.

AUTOMATIC TOWING MACHINES
Somewhat the cheapest, and altogether the best. Positively guaranteed.
Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

Chas. E. & W. F. Peck

ESTABLISHED 1870

58 William Street, New York City.
Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO., Ltd.
5 and 6 Billiter Ave., LONDON, E. C., ENGLAND,
AND AT "LLOYDS," LONDON.

Insurance Brokers

As brokers we represent ONLY THE ASSURED. Our clients being the VESSEL OWNERS, we refuse to represent insurance companies. We place insurances in the most advantageous market at the best procurable rates and terms. We leave it to the managers and general agents of insurance companies to protect the interests of their companies, maintaining that it is impossible for us to devote ourselves to the interest of both the owners and the insurance companies at the same time.

Average Adjusting Department
Williamson Building. Cleveland, Ohio.

GREAT LAKES REGISTER.

INCORPORATED.
Combined and Issued in Connection with the
BUREAU VERITAS
INTERNATIONAL REGISTER OF SHIPPING.

Great Lakes Register desires to announce that its ratings go before the leading Underwriters of America, England and France.

THE SERVICES OF ITS SURVEYORS MAY BE ENGAGED ON HULL AND CARGOES
F. D. HERRIMAN, SURVEYOR GENERAL,
320-322 Perry-Payne Building, - - CLEVELAND. O,

The Only Standard American Classification of Shipping.

Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.

A. A. RAVEN, President. W. R. T. JONES, Vice President,
W. H. H. MOORE, Treasurer. W. IRVING COMES, Secretary.

The Donnelly Salvage and Wrecking Co., Ltd.,

JOHN DONNELLY, SR., Pres.
JOHN DONNELLY, JR., Vice-Pres.
H. B. FOLGER, Treas.
THOS. DONNELLY, Secy.

KINGSTON ONT.

DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

INSURANCE

Geo. L. McCurdy,
169 Jackson Boulevard,
Chicago, - - Illinois.

Direct Representative of Leading American and Foreign Underwriters.

HULLS AND CARGOES.

H. G. TROUT,
KING IRON WORKS,

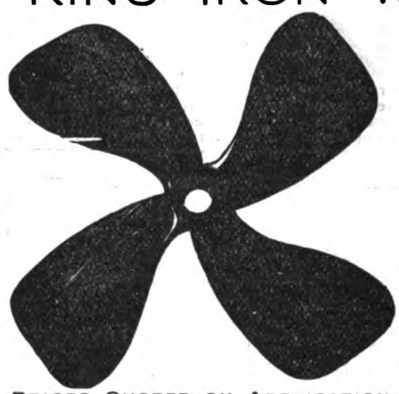
BUFFALO, N. Y.

Manufacturers of

Triple Expansion, Fore-and-Aft AND Steeple-Compound Marine Engines,

High and Low Pressure Engines, Sectional Propellers, Tug and Yacht Wheels.....

Cowles' Aluminum and Manganese Bronze Propeller Wheels.



These wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

ESTABLISHED 1854

SHERIFFS' STEAM STEERER

For Tug Boat Use

Easy to adjust, and can be handled by any one.

MANUFACTURED BY
SHERIFFS MFG. CO.,
Milwaukee, Wis.

A few of the best works on

Naval Architecture, Ship Yard Practice, Seamanship, Etc.

Modern Seamanship, by Lieut. Com. Austin M. Knight—$6.

Thearle's Works:
- Modern Practice of Ship Building in Iron and Steel—$5 25.
- Naval Architecture: A treatise on laying off and building wood, iron and composite ships—$3.
- Theoretical Naval Architecture—$3 50.

Naval Architecture—A manual on laying off iron and steel vessels, by Thos. H. Watson—$5.

Naval Architecture, by Sir W. H. White—$9.

Mackrow's Pocket Book—$5.

Steel Ships, by Thos. Walton—$5.50.

Resistance and Propulsion of Ships, by Durand—$5.

Practical Seamanship, by Todd and Whall—$8.40.

ORDER FROM
The Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

Generated on 2024-08-27 15:59 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

The MARTIN-BARRISS CO.

IMPORTERS AND MANUFACTURERS OF

MAHOGANY, WHITE MAHOGANY

AND ALL NATIVE CABINET WOODS

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim.

White Oak Timbers and Plank

Constantly on Hand and Sawed to Order on Short Notice,

654 SENECA ST. CLEVELAND, O.

AIDS TO NAVIGATION

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

THE SCHERZER ROLLING LIFT BRIDGE CO.,

MAIN OFFICES: 1616 MONADNOCK BLOCK,

CHICAGO, U. S. A.

All of the latest and largest LAKE STEAMSHIPS are completely equipped with BLAKE

DUPLEX AND SIMPLEX SPECIAL MARINE PUMPS.

New Marine Catalog ready about July 1st.

Geo. F. Blake Mfg. Co.

114 Liberty St., :: :: :: NEW YORK CITY.

LATEST PATENT ANCHOR

THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y.

Catalogue on Application.

The National and International

ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.

IN A RECENT TEST

MADE BY UNCLE SAM,

where both Foreign and Domestic Anchors were considered, the . . .

Baldt Stockless Anchor

was the only one approved

For Catalogue and particulars address

The Baldt Anchor Co., Chester, Pa.

SMOOTH-ON

TRADE MARK

Iron Cement No. 1

Unequaled for boiler patching, making flanged joints, stopping leaks in boiler seams, it has saved the use of many boilers, and for foundry use. SMOOTH-ON when mixed with water becomes a hard metallic iron that expands and contracts with the iron, and will withstand fire, steam, water or oil. sold in 5, 10 and 25 pound blue labeled cans. 60 page catalogue, and name of nearest jobber on request.

SMOOTH-ON MANUFACTURING COMPANY

572-574 Communipaw Ave., JERSEY CITY, N. J., U. S. A.

Telephone 76 Bergen. : Vreeland Tompkins, Chemist and Manager.

De Grauw, Aymar & Company.

ESTABLISHED 1827.

Cordage, Oakum, Vessel and Railroad Supplies.

SOLE MANUFACTURERS IN THE UNITED STATES FOR

TYZACK'S STOCKLESS ANCHORS.

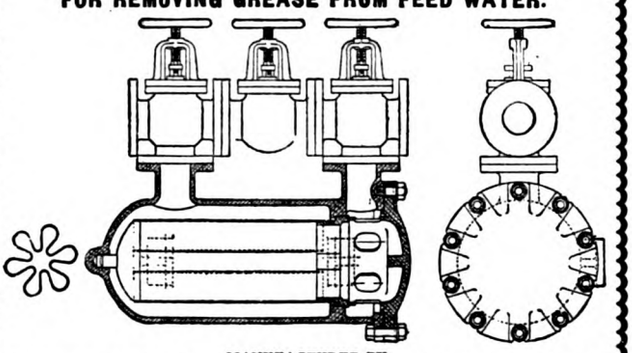
NEW YORK CITY.

CLEVELAND CITY FORGE & IRON CO.

IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT. COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

THE EBSEN GREASE EXTRACTOR

FOR REMOVING GREASE FROM FEED WATER.



MANUFACTURED BY

JAMES REILLY REPAIR & SUPPLY COMPANY,

220 & 230 West St., NEW YORK CITY.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

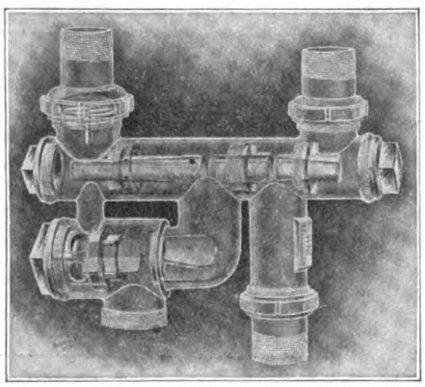
This is the only Injector

with but five working parts and
a range of 20 to 200 lbs. steam.
It is the

Auto-Positive

TRADE **PENBERTHY** MARK.

High Pressure, Hot Water



Restarting Marine Injector.

PENBERTHY INJECTOR CO.,
DETROIT, MICH.
Largest Injector manufacturers in the world.

U.S. AUTOMATIC INJECTOR

GET A NEW INJECTOR

and put it on your boiler while the boat is laid up.
Perhaps you had trouble this year with your old Injector. If you did, take it off and put a

U.S. AUTOMATIC INJECTOR

on. Then your troubles will be at an end as far as Injectors are concerned, because you can get water by simply turning on the steam. No fussing around to start the Injector. It is guaranteed to work right all the time. 200,000 in use.
Our Engineers' Red Book is free for the asking. Have you a copy?

AMERICAN INJECTOR CO.
Detroit, Mich.

Made in the United States

Used the World over

WEEKLY. ILLUSTRATED. PRICE 6D.

"THE SHIPPING WORLD"

Written by Experts ***Illustrated by Artists***

ANNUAL SUBSCRIPTION, UNITED KINGDOM $5.11
OTHER COUNTRIES - - - - $6.82

Contains the best and most informing illustrated literature regarding

Naval Architecture

Marine Engineering

Commercial & Shipping

Questions of the Day

The Shipping World Ld.
Effingham House, Arundel Street, Strand,
LONDON, ENGLAND.

Subscriptions and advertisements for The Shipping World accepted at The Marine Review offices.

A TREATISE
ON
ELECTROMAGNETIC PHENOMENA
AND ON THE
COMPASS AND ITS DEVIATIONS ABOARD SHIP.

IN TWO VOLUMES.

VOLUME I.
Electromagnetic Phenomena.

VOLUME II.
The Compass.
The Ship a Magnet.
The Mathematical Theory of the Deviations.
Swinging Ship and Compensation of the Deviations.
Various Matters Bearing on the Main Subject.

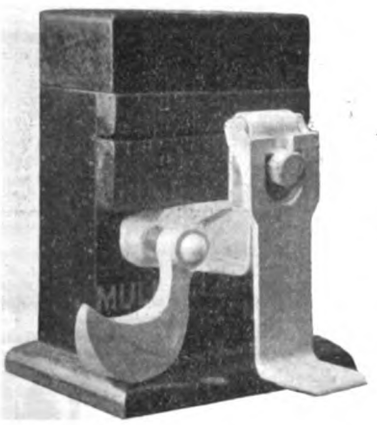
Price, $6.00 Per Volume.

FOR SALE BY
THE MARINE REVIEW PUB. CO.
39 - 41 Wade Building,
CLEVELAND.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

Now that the season of Vessel Repairs is about to begin, the following points are commended to vessel men concerning

MULHOLLAND'S
PATENT HATCH FASTENER.



It has held hatch combings and hatch covers together in storms that have torn the deck itself off of the vessel.

It can be applied to any vessel at less cost than is at first involved in long, burdensome hatchbars and strongbacks.

It is quick of operation and absolutely reliable.

The adoption of the Mulholland Fastener for more than 200 vessels of the great lakes is proof that it holds first place among devices of its kind. Its issue is not at all confined to the lakes. It is on such coast vessels as the seven-masted schooner "Thomas W. Lawson," and vessels of the United Transit Co.

Strength, Simplicity and Economy Commend this Device.

It secures with one grip and in one operation, the hatch cover, tarpaulin and batten.

It will keep a cargo dry under all conditions of weather because water cannot possibly get into the hatchway.

M. MULHOLLAND,

1203 Citizens' Building, - CLEVELAND, O.

All parts of the Mulholland Patent Hatch Fastener are made of malleable iron and are non-breakable Samples furnished upon application.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

ALFRED B. SANDS & SON

MARINE PLUMBERS

AND MANUFACTURERS OF

Marine Plumbing Specialties

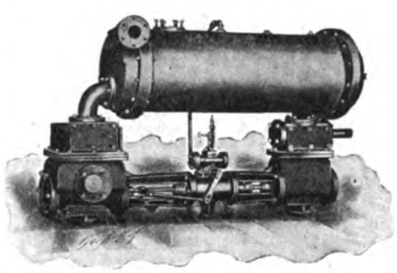
Marine Water Closet for either above or below water line.

Folding Lavatories, Ventilators, Pumps, Tanks, &c., &c.

134 BEEKMAN ST., New York.

JOHN E. THROPP & SONS CO.,

TRENTON, N. J.



BUILDERS OF

Marine and Stationary Engines and Boilers,

Surface Condensers,

Propeller Wheels and Shafts,

Thrust Bearings,

Machinery of Every Description.

Chas. Cory & Son,

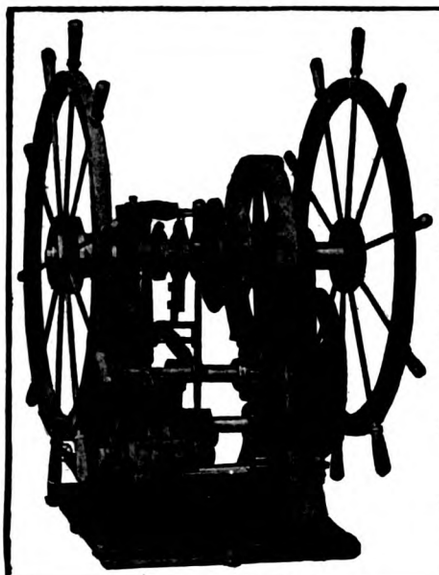
Manufacturers of

Mechanical and Electrical Telegraphs and Indicators.

Engine Bells and Electric Call Bells.

278-279 Division St.

NEW YORK CITY.



THE DAKE

Pilot House

Steam Steerer.

A Simple Compact and Durable Machine. Occupies Small Floor Space.

Write for descriptive circulars and prices.

MANUFACTURED BY

The Dake Engine Co.,

GRAND HAVEN, MICH.

DIXON

WHEN your engine groans, it needs Dixon's Graphite. Give it a spoonful and see how much better it feels and works. A single dose may cure. Ask for booklet 77 C.

JOSEPH DIXON CRUCIBLE COMPANY, JERSEY CITY, N. J.

WATER FILTERS REGULATORS & ENGINES

We make **Pressure Regulating Valves** for all purposes, steam or water.

Our **Feed-Water Filter** will keep oil out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs

THE ROSS VALVE CO. TROY N. Y.

Keep Oil out of your Boiler with the

FEED-WATER FILTER

For Marine and Land Service

Two of these Filters are in use on the Oceanic.

THE LUNKENHEIMER

For All Classes of Steam Boilers. Well designed, compact, efficient, durable, low priced and reliable. In action it is easy to start, has large range of work, full capacity, is absolutely automatic, and the discharge can be graded within wide limits. All parts are well proportioned, strong and durable, and any worn-out piece can be easily and quickly replaced at slight expense. Starts low at 22 lbs., works high to 185 lbs. Feed water 76°, lift 3 feet, works without adjustment of steam or water at pressures from 60 to 180 lbs. Automatically restarts if operation is temporarily interrupted. Tubes are easily removable for examination or repairs by the simple use of a common wrench. Devoid of small parts which are easily lost or unreliable in action. Fifty per cent. more durable than any other machine of its class. Retains original efficiency under constant usage and slight wear on tubes will not impair its operation. Works well with hot feed water and on long lifts. Impartial tests solicited and satisfaction guaranteed. Specify the *Lunkenheimer* Automatic Injector and order from your dealer.

THE LUNKENHEIMER CO., CINCINNATI, U. S. A.

Sole Owners and Patentees. Branches: { 26 Cortlandt St., New York. 35 Great Dover St., S. E. London.

AUTOMATIC INJECTOR

STEEL SHIPS.

THEIR CONSTRUCTION AND MAINTENANCE.

A manual for ship builders, ship superintendents, students and marine engineers. By Thomas Walton.

Price $5.50. THE MARINE REVIEW PUB. CO., **Cleveland.**

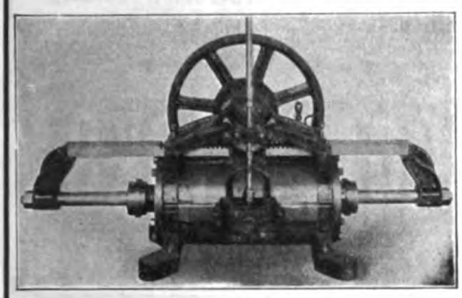
Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

A STEAM STEERER

DIRECT AND POSITIVE
QUICK ACTING. SPECIALLY ADAPTED



for Steam Yachts, Ferryboats, Lake, Ocean and Harbor Tug Boats.

Send for Catalogue and Particulars
MOULTON STEERING ENGINE CO.
17 State St., NEW YORK CITY

C. H. McCutcheon,

Copper, Tin and Sheet Iron Marine Work. Engineers' Supplies.

Brass Cocks, Globe Valves and Couplings, Iron Pipe Fittings and Supplies, Rubber Hose, Packing, Springs, Usudurian Packing.

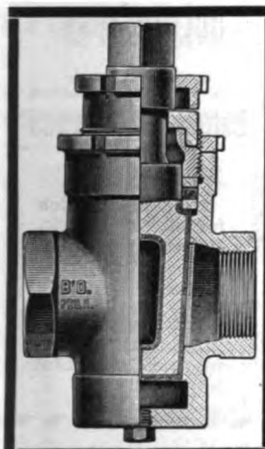
Buffalo, N. Y.

SHEPARD'S HORSE POWER SCALE

FOR DETERMINING
HORSE POWER,
SIZE OF CYLINDERS,
DENSITY, TEMPERATURE,
LATENT HEAT OF STEAM.

Has sold in great numbers at $1 each.

OFFERED AS A PREMIUM WITH ONE YEAR'S SUBSCRIPTION TO THE MARINE REVIEW AND MARINE RECORD AT $3.00.



BORDO

BLOW-OFF FOR HIGH PRESSURE

A FEW POINTS OF MERIT.

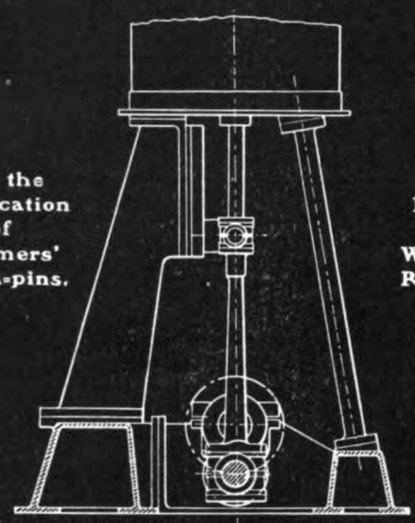
It is made with cased plug and rustless.
It opens and closes with a quarter turn.
It never raises from its seat.
It is always perfectly tight.
It will not stick, thereby operates easily.
It has full pipe area in ports.
It is easily adjusted to take up wear.
It is the engineer's safeguard.

L. J. BORDO

Cor. Twelfth & Thompson Sts., Philadelphia, Pa.

Vacuum

No. 1 MARINE ENGINE OIL



for the Lubrication of Steamers' Crank-pins.

Holds the World's Record.

STANDARD OIL CO., of New York

The Nicholson Perfected Ship Log

is the only log that accurately shows the speed of the moment of a ship on a dial, and records such speed on a paper record chart for every minute of the trip. It also registers the distance travelled. No line overboard. Placed in pilot house or wherever desired.

Catalogues and list of users on application.

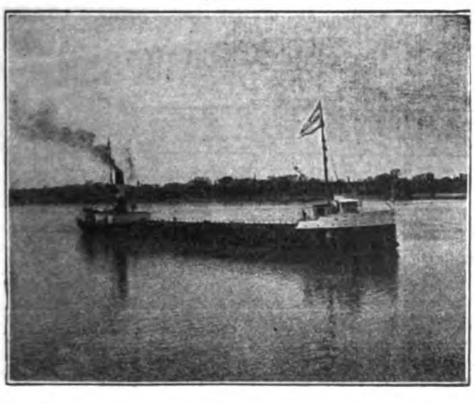
THE NICHOLSON DISTANCE FINDER

The Simplest Device on the Market.

Price $25.00.

Nicholson Ship Log Co. 204 Superior St., CLEVELAND, O.

CRANE VALVES



CRAIG SHIP BUILDING CO.

TOLEDO, OHIO.

METAL-AND-WOODEN-SHIP-BUILDERS.

New Dry Dock—450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships
A SPECIALTY.

Generated on 2024-08-27 16:04 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

You Should Use Dearborn Treatment

Constantly, with the waters going into the boilers, a small quantity of Water Treatment to prevent scale.

Takes off the old scale, prevents new scale from forming, and stops any corrosion taking place in the boilers.

CONDENSED VEGETABLE EXTRACTS.

DEARBORN DRUG & CHEMICAL WORKS

120 Liberty Street, NEW YORK. | 10 Branch Offices in U. S. | 27-34 Rialto Bldg., CHICAGO.

Time and Distance Tables

Most Valuable Little Book ever issued by The Marine Review

Send for it on Approval.

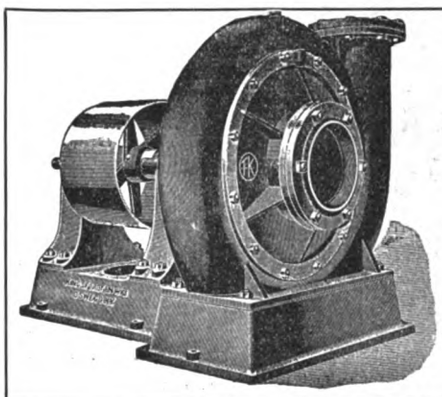
A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time-saver to the vessel owner or vessel agent as well as captain or engineer.

Everything at a Glance

Examination of it for the Asking.

Price $1.00

THE MARINE REVIEW PUB. CO.
Wade Building, Cleveland.

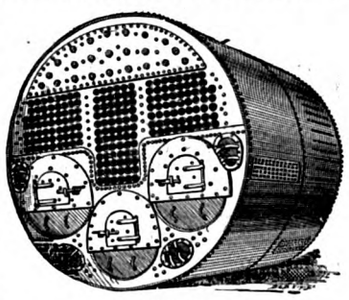


DREDGING, WRECKING CIRCULATING AND BALLAST PUMPS.

MARINE BOILERS.

Kingsford Foundry & Machine Works,
OSWEGO N. Y.

Northwestern Steam Boiler & Mfg. Co.



DULUTH, MINN.

MANUFACTURERS OF

Boilers, Engines and Machinery.

Special facilities for Marine Work. Repairs promptly attended to Night or Day.

We carry a complete line of Marine and Engineers' Supplies.

TELEPHONES:
OFFICE AND WORKS, 615.
Residence Calls:
M. A. RYAN, Pres. and Gen'l Mgr., 776 R.
J. H OPPERMAN, Secretary, 579 R.
E. KRIZ, Superintendent, 557 M.

SHELBY Cold Drawn, Seamless Boiler Tubes

SUITABLE FOR ALL CLASSES OF MARINE BOILERS

Shelby Steel Tube Co., GENERAL SALES OFFICE PITTSBURGH, PA.

BRANCH OFFICES
NEW YORK. CHICAGO.

Generated on 2024-08-27 16:03 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

THE BABCOCK & WILCOX COMPANY,

NEW YORK AND LONDON.

FORGED STEEL WATER TUBE MARINE BOILERS

362,000 Horsepower in the United States Navy. 186,000 Horsepower in the British Navy.
225,000 Horsepower in the American Merchant Marine.

ADOPTED BY THE BRITISH ADMIRALTY IN

LARGE CRUISERS AND BATTLESHIPS.

Orders have also been received for the navies of Italy, Russia, Norway and Denmark.

No Cast Metal.
No Bent Tubes.
No Screwed Joints.
Lightness.
Accessibility.
No Automatic Devices.
Safety Under High Pressure.

Bayonne, New Jersey, U. S. A.
Paris, France.
WORKS:
Renfrew, Scotland.
Oberhaussen, Germany.

For High-Grade Installations in the Navy and Merchant Marine

THE NICLAUSSE BOILER

609,000 Horse Power in the Navies of
ENGLAND, UNITED STATES, FRANCE, GERMANY, JAPAN, RUSSIA,
ITALY, SPAIN, TURKEY, CHILE, ARGENTINE REPUBLIC.

105,000 HORSE POWER IN THE UNITED STATES NAVY.

Manufactured by THE STIRLING COMPANY, CHICAGO, ILL.

Screw Propeller Computer
(McDERMOTT)
For quickly determining dimensions and proportions of screw propellers for any set of conditions.
$5.00

THE ROBERTS

Safety Water Tube Boiler Co

MANUFACTURERS OF

High Grade Marine
Water Tube Boilers.

Generators of the Highest Quality of Steam.

Nearly 1500 in use.

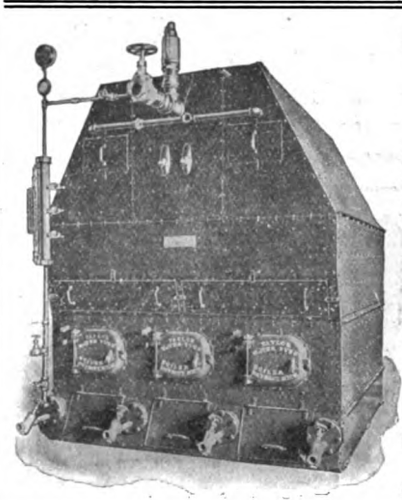
Send for Circulars and Stock Sheet.

Works:
RED BANK, N. J.
Phone, 49 Red Bank.

Main Office:
39 Cortlandt St.,
NEW YORK, N. Y., U. S. A.
Phone, 599 Cortlandt.

Cable Address:
"BRUNIVA."

Taylor Water Tube Boiler Co.



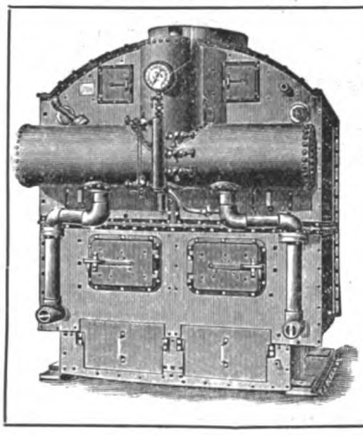
322 Franklin St.,
DETROIT, MICH.

Vertical Tubes, sectional, large steam space and liberating area.

Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine.

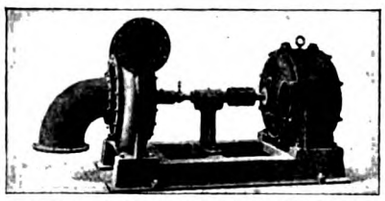
Free circulation type.

Send for full description.



250 STEAM VESSELS
NOW EQUIPPED WITH
ALMY'S PATENT
SECTIONAL
Water-Tube Boilers
BEAR EVIDENCE OF THEIR
Excellent Qualities
ALMY WATER-TUBE
BOILER CO.
PROVIDENCE, R. I.

Generated on 2024-08-27 15:58 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY



Westinghouse Induction Motor counected to Jackson Pump.

Westinghouse

Motor-Driven Pumps

Can always be depended upon.

Circulars 1042 and 1050 for particulars.

Westinghouse Electric & Mfg. Co.

Sales Offices in all Large Cities. Pittsburgh, Pa.

JENKINS BROS. PUMP VALVES

are made from various compounds, each of which is best adapted for a particular kind of work. Our many years of experience has enabled us to so perfect these compounds and the process of manufacture that we can confidently recommend our pump valves as the very best obtainable.

They are guaranteed, and unless used in service for which they are not intended we will always replace such as fail to give satisfactory or reasonable service.

All genuine bear our Trade Mark as shown in the cut.

JENKINS BROS.,

New York. Boston. Chicago. Philadelphia. London.

The Shipowners Dry Dock Co.,

CHICAGO.

Repairs to Steel and Wooden Vessels. || **Three Docks at Halsted Street and North Branch.**

OFFICES, RIALTO BUILDING.

OFFICE TELEPHONE, HARRISON 1020.
YARD TELEPHONE, NORTH 1659.

W. W. WATTERSON, Supt.
TELEPHONE, LAKEVIEW 198.

ASHTON

Cam Lever Pop Safety Valves and Non-Corrosive steam gauges

give highest efficiency and durability. Specify them and get the best.

The Ashton Valve Co., Boston, New York and Chicago, U. S. A.

GENERAL ELECTRIC COMPANY'S

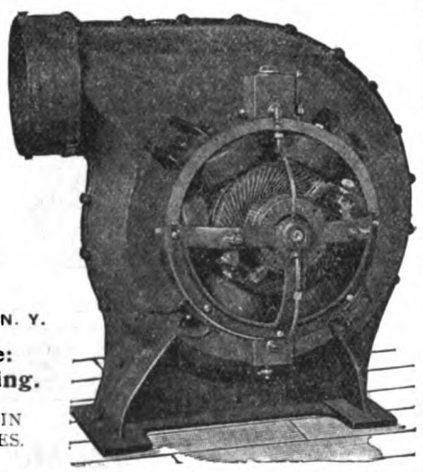
Electric Blowers & Exhaust Fans,

May be run with less attention than any other motive power.

GENERAL OFFICES: SCHENECTADY, N. Y.

Cleveland Office: Citizens Building.

SALES OFFICES IN ALL LARGE CITIES.



THE BOURNE-FULLER CO.

IRON, STEEL, PIG IRON, COKE.

Cleveland, Ohio

Bessemer and Open Hearth Plates for

SHIPS	BRIDGES
BOILERS	TANKS

Improved Belt Helmet

Established 1844.

A. SCHRADER'S SON,

32 Rose Street, NEW YORK.

Manufacturer of

Submarine Armor and Diving Apparatus.

We carry a complete stock of Dresses, Hose and Repair Sundries.

All orders filled day received. Write for our prices.

Time and Distance Tables for Lake Ships

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time saver to the vessel owner or vessel agent as well as captain or engineer. Send for it on approval.

Price $1.00

MARINE REVIEW PUB. COMPANY

39-41 Wade Building, Cleveland, Ohio

Generated on 2024-08-27 16:00 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

4 PER CENT ON SAVINGS.

CAPITAL $1,500,000.

(Surplus and Undivided Profits Earned $152,000.)

Pays Interest on Check Accounts.

Acts in Any Trust Capacity.

Superior, Corner Water Street.

THE L. P. & J. A. SMITH CO.

CONTRACTORS FOR PUBLIC WORKS

Dredging, Harbor Work, Pile Driving, Breakwaters, Dry Docks and Pier Building.

Railroads, Canals, Bridges, Submarine Foundations, Etc., Etc.

Offices: Williamson Bldg., Cleveland, O.

Thearle's Works on Ship Building.

STANDARDS IN ENGLAND AND SCOTLAND.

KNOWN AND USED WHEREVER STEEL SHIPS ARE BUILT.

SEPARATE VOLUMES FOR PLATES.

"Ship Building in Iron and Steel." (Plates in separate volume.) $5.25.

"Ship Building and Laying Off." (Plates in separate volume.) $3.00.

"Theoretical Naval Architecture." (Plates in separate volume.) $3.50.

THE MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., CLEVELAND

FAHEY & CO. Bankers & Brokers.
TELEPHONE, MAIN 2754.
1011-1015 THE WILLIAMSON BLDG. CLEVELAND, O.
EVERY POSSIBLE FACILITY FOR CONDUCTING A BROKERAGE BUSINESS IN STOCKS, BONDS, GRAIN, Etc.

The Cleveland Trust Company

A safe depository for the surplus funds of firms, corporations and individuals.

4% on Savings Deposits.

CAPITAL and SURPLUS - $2,800,000.00
DEPOSITS - - - $16,000,000.00

No 1 EUCLID AVE. No 121 EUCLID AVE

Practical
COMPASS ADJUSTMENT
on
Iron, Composite and Wooden Vessels.

Compass Deviation,
Its Various Causes and Proper Cures.
WITH ILLUSTRATIONS.
By CAPT. W. J. SMITH.

For helping those who have had little or no experience in actual Compass Adjustment.

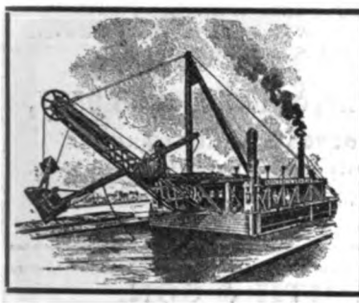
CONTENTS:

Excusable Negligence.
Obstacles.
Facts Connected with an Iron Ship and Her Compass.
Transient Induction.
Wooden Steamers.
On Magnets.
Preparatory Arrangements.
The Operation on the Standard Compass.
Retentive Magnetism.
Tracing Matters for Ship's Head East or West.
Heeling Error.
Description of the Marine Dipping Needle.
Absolute Necessity for Compass Adjustment.
Improper Use of Magnets.
Revising the Compass Record.
Adjusting by Distant Object.
Reciprocal Bearings.
Adjusting by One Magnet.
Transit Bearings.
Helpful Reminders.
Co-Efficients: Meaning of the Terms.
The Compass Deviascope.
Uncompensated Steering Compass.

Price, Postpaid,
$2.

Order from
The Marine Review Pub. Co.,
39-41 Wade Bldg., Cleveland.

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY



Chicago & Great Lakes Dredge and Dock Co.
SUCCESSORS TO
LYDON & DREWS CO. of Chicago,
HAUSLER & LUTZ TOWING & DOCK CO. of So. Chicago.
Contractors for River and Harbor Improvements.
Designers and builders of Foundations, Bridges, Piers, Breakwaters, Lighthouses, Tunnels, Pneumatic & Sub-Marine work.
1319-20-21-22 Chamber of Commerce Bldg.
Telephones: Main {794 / 795
So. Chicago 63
CHICAGO.
Yards, North Branch, Foot of Carpenter St., and Calumet Slip, South Chicago.

BUFFALO DREDGING CO.
GENERAL CONTRACTORS ON SUBMARINE WORK.
Office D. S. MORGAN BLDG. *BUFFALO, N. Y.*

THE LAKE ERIE DREDGING CO., BUFFALO, N. Y.
Dredging; Submarine Rock Removal, Etc.

John D. Gilchrist, Pres. John Marron, Sec'y.
John A. Flajole, Gen'l Mgr.
THE FOREST CITY BOILER CO.
Marine Work a Specialty.
264 Merwin St. Tel. Main 1886
CLEVELAND, OHIO.

ORAM FIX. ESTABLISHED 1860. J. W. FIX.
S. FIX'S SONS,
Successors to S. FIX & SON,
Steam Flue Welding Works
Our Work Stands Government Test.
Our Welds are Perfectly Smooth.
Write us for Prices.
COR. LEONARD AND WINTER STS. Cleveland, O.

DOWNING METALLIC PACKING
Sold Under 5 Years' Guarantee
WRITE FOR CATALOGUE
THE N. L. HAYDEN MFG. CO.
COLUMBUS, OHIO

PHOTOGRAPHS
OF VESSELS AND MARINE VIEWS.
See Lists on Page 41 of This Issue.

Authors of "McNevin Bros' Epitome on Navigation."
ALFRED D'A. McNEVIN,
Teacher of Navigation.
Of McNevin Bros. Navigation School, San Francisco, Cal.
Established 1875 by Capt. Edmund McNevin.
LAKE AND OCEAN NAVIGATION IN ALL ITS BRANCHES THOROUGHLY AND PRACTICALLY TAUGHT AND ILLUSTRATED. ALSO THE VARIOUS METHODS AND INSTRUMENTS IN USE TO DETERMINE THE DEVIATION OF THE COMPASS AND TO CORRECT SAME.
CANDIDATES CAREFULLY PREPARED FOR EXAMINATION FOR U.S. LICENSE FOR STEAM AND SAIL.
TERMS REASONABLE.
STUDENTS TAUGHT THE USE OF VARIOUS INSTRUMENTS EMPLOYED IN NAVIGATION.
INQUIRIES WILL RECEIVE IMMEDIATE ATTENTION.
For particulars, apply to ALFRED D'A. McNEVIN, DETROIT, MICH.

Chicago Nautical School, Eighth Year.
MASONIC TEMPLE, CHICAGO.
W. J. Wilson, Principal. (Late Lieutenant, U. S. N.)
A full and complete course of instruction in Lake and Ocean Navigation and Marine Engineering. Also special branches taught those desiring to qualify themselves for better positions in the Marine Service. Students taught by correspondence. Students may begin at any time. Diplomas will be issued to all graduates passing satisfactory final examinations. Candidates prepared for Annapolis. SEND FOR CIRCULAR.

PHONE—BLACK 5424
SUCCESSFUL COMPASS ADJUSTER
THEORY AND PRACTICE
SEATTLE NAUTICAL COLLEGE
CAPTAIN W. J. SMITH, Principal.
Graduate of Trinity Nautical College. Holding Master's unlimited ocean license, steam and sail; American and British. Author of the "Self-Instructor in Navigation" and "Practical Compass Adjustment."
MISS HELEN C. SMITH, Instructor.
2225½ FIRST AVE. - SEATTLE, WASH.
ESTABLISHED 1898
NAVIGATION AND NAUTICAL ASTRONOMY CLEARLY TAUGHT

CHARTS
OF THE
St. Lawrence River and the Coast.
We can supply charts sufficient to take a vessel from the lakes to the Atlantic ocean, and from the Gulf of St. Lawrence to the coast of Florida.
A complete set of charts from
Lake Ontario to the Atlantic Ocean.
Marine Review Pub. Co.
39-41 Wade Bldg., Cleveland, O.

THE ONLY
MARINE DIRECTORY
BLUE BOOK
—OF—
AMERICAN SHIPPING
NOW IN ITS NINTH YEAR.

Every ship builder, marine engine and boiler builder, ship owner, naval architect, marine engineer, and, in fact, everyone in the United States whose business is with ships is mentioned in the Blue Book and his address given. The aim has been to make it a complete working directory of the marine trade of the United States. With its aid you may reach anyone connected with this great branch of industry.

Its statistics of waterborne commerce are thoroughly reliable. The section devoted to the commerce of the great lakes with its iron mines and their output, its coal trade and dock facilities, its grain trade and elevators, its ships and their owners, is very thorough and absolutely authentic. . . . . .

MARINE REVIEW PUB. CO.
39-40-41 WADE BLDG., CLEVELAND, O.

Generated on 2024-08-27 15:57 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter Carrying Different Grades at all Times.

Fuel Scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

M. A. Hanna & Co., Miners and Shippers,

Main Office, Perry-Payne Bldg., Cleveland.

J. B. COWLE, Pres. W. E. PERKINS, Sec'y and Treas
MAT. THOMAS, Gen'l Mgr.

The Union Machine & Boiler Company,

MACHINISTS, FOUNDERS AND BOILER MAKERS.

Jobbing solicited. Steel vessel repairs promptly attended to night or day.

108 TO 114 RIVER STREET. CLEVELAND, O.

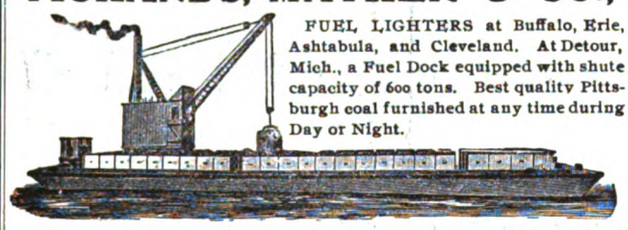
Phones: Bell Main 609. Cuy. A. 711. Night Call Cuy. M. 1843.

ABRAM SMITH & SON,
ALGONAC, MICH.

Wooden Ship Building and Rebuilding.

Before placing your work we will be pleased with an opportunity to quote YOU our prices.

PICKANDS, MATHER & CO.,



FUEL LIGHTERS at Buffalo, Erie, Ashtabula, and Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.

STEAMBOAT FUEL
at TOLEDO and HURON.
IRONVILLE DOCK & COAL CO.,

429 Spitzer Building, Toledo, Ohio.

Office, Main 1513. : : : Bell Phones : : : Dock, East 63.

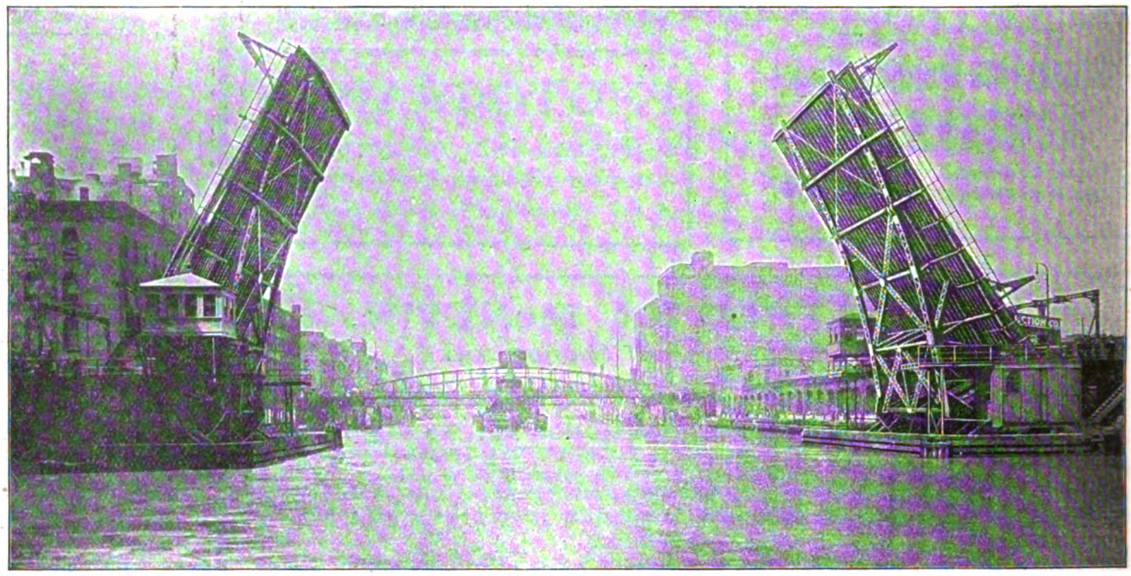
Coal of Best Quality MASSILLON & PITTSBURG No. 8.

CONTRAST

The wide and clear channel provided for navigation by this Scherzer Rolling Lift Bridge with the two narrow and inadequate channels allowed by the obstructing center-pier swing bridge further up the river.

Scherzer Rolling Lift Bridges

can be opened or closed in less than 30 seconds, and in opening roll back and away from the navigable channel, giving greater freedom for the movement of vessels through the draw than any other type of movable bridge. They can be designed to span any desired width of channel and to meet the most complex local conditions.



THE SCHERZER ROLLING LIFT BRIDGE CO., MAIN OFFICES: 1616 Monadnock Block, CHICAGO, U.S.A.

The Blue Book of American Shipping

The only Marine Directory of the United States containing names and addresses of Ship Owners, Ship Masters, Ship Builders, Naval Architects, Marine Engineers and of every interest active in the Shipping Field. Also Statistics of Shipping and Ship Building in America. :: :: :: :: :: :: :: Sent on approval

Marine Review Publishing Company, 39-41 Wade Building, Cleveland, Ohio.

Price $5.00

A COMPLETE SET OF CHARTS OF THE GREAT LAKES ELEVEN IN ALL.
(Edges bound with Tape to Prevent Tearing.)

Sent to any Address, Carriage Prepaid, for $5.45.

THE MARINE REVIEW PUB. CO., 39-41 WADE BUILDING, CLEVELAND, OHIO.

Generated on 2024-08-27 15:56 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

PITTSBURG COAL COMPANY.

Steamboat Fueling Facilities at Various Points on the Great Lakes:

CLEVELAND HARBOR { 4 Car Dumpers. 3 Lighters. | FAIRPORT HARBOR { 1 Car Dumper. 1 Lighter. | ASHTABULA HARBOR { 1 Car Dumper. 1 Lighter. | ERIE HARBOR { 1 Car Dumper. Fuel Pockets.

DETROIT RIVER BRANCH { Docks and Pockets at Sandwich and Amherstburg | SAULT RIVER BRANCHES { Dock and Pockets at Detour. Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY THE BEST GRADE OF **Pittsburg and Youghiogheny Coal.**

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO.

STEAMBOAT FUEL AT CHICAGO.

THE Y&L

Youghiogheny and Lehigh Coal Company.

J. T. CONNERY, Manager — ARCHIE J HITCHCOCK, Dock Sup't.

Main Office: 902-906 Fisher Bldg., 277 DEARBORN STREET.

FUEL DOCKS.

No. 1, Michigan Slip and Basin, - - 'Phone Har. 4156.
No. 2, North Halsted Street Bridge, - 'Phone Har. 4157.
No. 3, Foot South Water St. and Illinois Central Slip C. 'Phone Har. 4158.

FUEL LIGHTER.

Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.

Long Distance Telephone, Har. 4156.

The Rochester & Pittsburgh Coal & Iron Co.—Steamboat Fuel Dock—Blackwell Canal at Michigan St. Bridge. 1400 feet of dock frontage. Hulett Car Dumping Machine. Steam Fuel Scow of 600 tons capacity. Boats coaled day or night. Office: 684-88 Ellicott Sq. Buffalo, N. Y.

Tels. Bell, Seneca 1245, Frontier 27002
E. McQ. Duthie, Cargo and Fuel Agent.

THE STANLEY B. SMITH COAL AND DOCK CO.

Toledo Harbor, Toledo, Ohio.

1,800 Feet of Dock. 6 McMyler Derricks. Capacity 3,000 Tons Daily.

FUEL LIGHTERS.

"Kanawha"—"Pennsylvania"—"Hocking"

DOCKS

Pennsylvania R. R. Hocking Valley R. R. Toledo and Ohio Central R. R.

SMITH'S COAL DOCK

12 POCKETS. PLATFORM. LOW DOCK.

Operated by STANLEY B. SMITH & CO.,

Detroit River, Detroit, Mich.

MARINE SUPPLY COMPANY. — STORE AND ICE HOUSE ON DOCK.

CASTNER, CURRAN & BULLITT,

SOLE AGENTS FOR

C. C. B. POCAHONTAS SMOKELESS SEMI-BITUMINOUS **COAL**

THE BEST STEAM COAL IN THE WORLD.

C.C.B. POCAHONTAS COAL Trade Mark Registered

Officially endorsed by Great Britain and United States. Standard Fuel of United States Navy. For ten years used exclusively on Cunard, White Star and other Transatlantic Lines.

Main Office, Arcade Bldg., 1 S. 15th St., PHILADELPHIA, PA.

BRANCH OFFICES:

1 Broadway, New York.
Citizens' Bank Building, Norfolk, Va.
Old Colony Building, Chicago, Ill.
70 Kilby Street, Boston, Mass.
4 Penchurch Avenue, London, England.
Terry Building, Roanoke, Virginia.
Neave Building, Cincinnati, Ohio.

Generated on 2024-08-27 15:57 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

VESSEL AND INSURANCE AGENTS.

T. R. McCARTHY,

STEAMSHIP and FREIGHT BROKER.

Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.

Marine and Fire Insurance Effected.

Cable address: "MACARTHY, MONTREAL."

(Watkins', Scott's, Lieber's and A. B. C. Codes used.)

Shipping Agent to THE ASBESTOS & ASBESTIC CO., Ltd., of Danville, Que.

6 St. Sacrament St. - - - - - - - - Montreal, Can.

Correspondence invited and Agencies Solicited.

P. H. FLEMING & CO.

INSURANCE and VESSEL AGENTS

MARINE, FIRE, OCEAN, LIABILITY.

Telephone Harrison 1359

No. 2 Sherman Street - - CHICAGO, ILL.

C. W. Elphicke. H. B. Earhart.

C. W ELPHICKE & CO.,

VESSEL AND INSURANCE AGENTS,

No. 6 Sherman St., CHICAGO, ILL.

Telephone, Harrison 1194.

W. A. Hawgood. Arthur H. Hawgood.

W. A. HAWGOOD & CO.,

VESSEL and INSURANCE AGENTS.

220-221 Perry-Payne Bldg., - - - CLEVELAND, O.

Office Telephone, Main 2295.
Residence Telephone, W. A. Hawgood, Doan 84-J.
Residence Telephone, Arthur H. Hawgood, Doan 841-J

John Mitchell. John F. Wedow. Alfred Mitchell.

MITCHELL & CO.,

VESSEL and INSURANCE AGENTS,

508, 509 & 510 Perry-Payne Bldg.

Office Telephone, M 767. Residence, John Mitchell, Doan, 341. John F. Wedow, Doan, 141-J. Alfred Mitchell, Doan, 218.

CLEVELAND, - - - - - - - - - - - OHIO.

C. L. Hutchinson. W. H. McGean.

HUTCHINSON & CO.,

VESSEL and INSURANCE AGENTS,

Office Telephone, Main 2453.

Residence, C. L. Hutchinson, Ridge 345-L.

Residence, W. H. McGean, East 1421-J.

313-315 Perry-Payne Bldg., - - CLEVELAND, O.

W. C. RICHARDSON,

VESSEL OWNER and BROKER
and
MARINE INSURANCE AGENT,

420-421 Perry-Payne Bldg. - - CLEVELAND, O.

Office Telephone 338; Residence Telephone, 2268.

D. Sullivan. F. J. Sullivan.

D. SULLIVAN & CO.

VESSEL AGENTS.
MARINE INSURANCE.

2-4 Sherman Street, - - - - - CHICAGO, ILL.

Office Tel., Harrison 2847; Residence, Ashland 2453.

John B. Hall. Harry B. Root.

HALL & ROOT,

VESSEL AGENTS.

21-22 Exchange Bldg, 202 Main Street.,

Telephone, Seneca, 892. BUFFALO, N. Y.

JOHN J. BOLAND,

VESSEL and INSURANCE AGENT.

25-26 Exchange Building, 202 Main St.

Telephone, Seneca, 115. BUFFALO, N. Y.

A HANDBOOK OF

MARINE INSURANCE

By WILLIAM GOW,

Second Edition

$1.50

THE MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, O.

VESSEL AND INSURANCE AGENTS.

J. J. H. Brown. J. B. Rodgers. Edward Smith.

BROWN & CO.,

VESSEL and INSURANCE AGENTS,

202 Main Street, - - - - - - BUFFALO, N. Y.

D. T. HELM & CO.

VESSEL and INSURANCE AGENTS.

Telephones—Office, 263
Res. 381-3.

DULUTH, - - - - - - - - - - MINN.

SAMUEL HOLMES,

STEAMSHIP OFFICES, Morris Building, 66-68 Broad St.,

For Selling, Chartering and Building all Classes Steam Vessels.

Steam Vessel Circulars.
Weekly Freight Circulars. NEW YORK.

RUFUS S. KING,

Commission Merchant and Broker

MARITIME BUILDING, 6-10 BRIDGE ST.,

Near Battery Park, NEW YORK.

Has the Largest List of Steamships and Sailing Vessels for Sale in America, Consequently Most Bargains.

Buying, Selling and Building of Steamships, Ships, Yachts, Tugs, Steam Lighters, Schooners, Barges, etc.

Expert on Valuation of Steam and Sailing Vessels.

CABLE ADDRESS, "RUFUS," WATKINS' CODE.

TELEPHONE, 3404 BROAD.

F. H. WEEKS,

MARINE BROKER,

Vessels Sold, Chartered, Built and Insured.
Cable Address, WEEKSHIP, New York.

Telephone, 3875 Broad. 82 Broadway, New York.

Charles P. Notman. David H. E. Jones.

JAMES W. ELWELL & CO.,

Established 1839.

SHIP BROKERS and STEAMSHIP AGENTS.

Sell and Charter all Classes of Vessels.

Agents for Cyprien Fabre & Cie. S. S. Line, Cie. Havraise Peninsulaire, and Northwestern S. S. Co.

Battery Park Bldg., 21-24 State St. NEW YORK.

PROCTORS IN ADMIRALTY.

RAY G. MacDONALD,

Attorney-at-Law and Proctor in Admiralty.

Suite 618 New York Life Building,

Telephone, Central 723. CHICAGO, ILL.

SHAW, WARREN, CADY & OAKES,

Attorneys-at-Law,

904 to 907 Union Trust Bldg....

Telephone, 685. DETROIT, MICH.

C. E. KREMER,

Counsellor at Law and
Proctor in Admiralty.

Suite 321-323 - - - - New York Life Building.

CHICAGO - - ILL.

WILLIAM H. FAUST,

Lieutenant, United States Navy, (ret.)

COUNSELOR and PROCTOR IN ADMIRALTY.

Room 344 Federal Building, BUFFALO, N. Y.

PROCTORS IN ADMIRALTY.

HARVEY L. BROWN,

PROCTOR IN ADMIRALTY.

35 White Building, - - - - - BUFFALO, N. Y.

HOYT, DUSTIN & KELLEY,

LAWYERS AND PROCTORS IN ADMIRALTY.

Offices, 702 Western Reserve Building,

CLEVELAND, - - - - - - - - - OHIO.

White, Johnson, McCaslin & Cannon,

ATTORNEYS-AT-LAW and
PROCTORS IN ADMIRALTY.

Williamson Building, - - - - CLEVELAND, O.

GOULDER, HOLDING & MASTEN,

LAW OFFICES,

Harvey D. Goulder, S. H. Holding, Frank S. Masten.

Perry-Payne Building, - - - CLEVELAND, O.

ALBERT J. GILCHRIST,

PROCTOR IN ADMIRALTY.

604 Perry-Payne Building, - - - CLEVELAND, O.

O. C. Pinney. Dorr E. Warner.

PINNEY & WARNER,

LAWYERS AND PROCTORS IN ADMIRALTY.

Rooms 316 and 317 Perry-Payne Building.

Telephone, Main 2585 - - - - CLEVELAND, O.

PROFESSIONAL.

W. J. WOOD, NAVAL ARCHITECT, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

Vessels designed—Twin S. S. Virginia, U. S. S. Frolic, formerly steam yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

Complete Plans Furnished For
Steel Composite or Wooden Vessels.

709 Rialto Building - - - - - - CHICAGO.
Tel. Harrison 1020.

R. L. NEWMAN, Consulting Engineer, Naval Architect.

SHIP AND YACHT BROKER.

Attention to development of designs and superintendence during construction. Vessels for carrying oil in bulk a specialty; also surveys on general repairs. Oil fuel systems for marine and land purposes developed under the patents of the International Oil Fuel Construction Company of New York.

817 Chesebrough Bldg., Bowling Green, NEW YORK.

JOSEPH KIDD,

Marine Architect and Surveyor. Consulting Ship Builder and Engineer.

Over thirty years' experience. Specifications, Designs and Estimates, Superintendence of Construction and Repairs. Damage and Other Surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade. - - - - DULUTH, MINN.

EDWARD GASKIN,

SHIP BUILDING EXPERT.

Plans and Specifications for Ships, Surveys and Estimates, superintendence, etc.

Ellicott Square, - - - - - BUFFALO, N. Y.

AMBROSE V. POWELL, M. Am. Soc. C. E.

CIVIL ENGINEER,

Designs and Constructs Dry Docks, Harbor Works, Docks and Plant for Handling Coal and Ore, Foundations.

Office, 1008 Chamber of Commerce, CHICAGO, ILL.

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

PROFESSIONAL

Members Maritime Association Port of N. Y.

SADLER, PERKINS & FIELD

Naval Architects and Engineers.
Chartering and Brokerage.
Maritime Building, New York.

NEW YORK. DETROIT.

H. MATTESON, Jr. GEO. B. DRAKE.

Matteson & Drake

Naval Architects and Consulting Engineers

DESIGNING AND SUPERINTENDENCE OF BUILDING AND REPAIRING STEEL AND WOODEN VESSELS.

Bulk Oil Vessels a Specialty.

Agents for Marine Specialties.

708-707 Bourse. - - PHILADELPHIA.

ROBERT LOGAN,

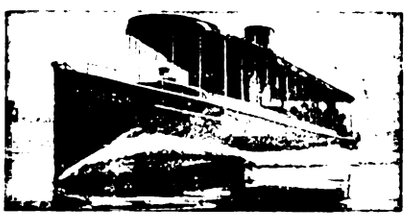
Marine Architect, Mechanical Draughtsman, Consulting Engineer.

Specifications and designs for all descriptions of Marine Vessels, Engines and Boilers, Superintends Construction and Repairs. Damage and other Surveys carefully attended to.

810 Western Reserve Bldg. CLEVELAND, O.

CHARLES D. MOSHER,

NAVAL ARCHITECT AND ENGINEER,
No. 1 Broadway, NEW YORK.



THE FASTEST YACHTS IN THE WORLD.

Arrow, 45.06 miles per hr. Hilide, 40.2 miles per hr. Feissen, 31.6 miles per hr. Norwood, 30.5 miles per hr. Presto, 31 miles per hr. Yankee Doodle, 29.5 miles.

The Mosher Patent Triple and Quadruple Expansion Engines and Water-tube Boilers. These boilers have been supplied for no less than eleven of the torpedo boats of the U. S. Navy, the U. S. Monitor, Florida and six torpedo boats for Russian government, besides for numerous other fast yachts and launches. Most powerful, lightest and compact boiler made.

Pittsburgh Testing Laboratory, Ltd.,

INSPECTING AND METALLURGICAL ENGINEERS AND CHEMISTS,

1750 Monadnock, CHICAGO. 235 Water Street, PITTSBURG,
906-7 Crozier Building, Philadelphia,
New York City, 60 New Street.
Richmond, Va., 1107 1-2 Main St.

Inspectors of Shipbuilding Materials and Machinery. Inspectors located at all mills. Physical and Chemical Laboratories. Tests of all kinds.

ROBERT W. HUNT & CO.

BUREAU OF INSPECTION.
TESTS AND CONSULTATION.

1121 The Rookery, Chicago.
Monong. Bank Bldg., Pittsburg.
66 Broadway, New York.

Inspectors of Shipbuilding Material and Machinery. Inspectors of all Materials. Duty Tests of Engines and Boilers. Physical and Chemical Laboratories.

PATENTS.

E. L. Thurston. Albert H. Bates.

THURSTON & BATES,

Counselors at Law in Patent Causes, and Solicitors of Patents,

1038 Society for Savings Bldg., - CLEVELAND, O.

Photographs of Lake Vessels.

Unless otherwise specified, negative size of following Photographs is 7x9 inches, and price is 75 cents each Postage paid.

Alva.
Angeline, Hold. (Size 10x18—Price $1.50.
Angeline, Spar Dock. (Size 10x18—Price $1.50.
Argyle. (Thousand Islands).
Argyle. (Thousand Islands).
James Battle. (Detroit Fire Boat). On the ways.
James Battle. (Detroit Fire Boat). The launch.
Castalia.
Chicora.
Chippawa.
City of Bangor.
City of Erie at Buffalo Docks.
City of Erie.
Columbia. (On the Ways—Three Views).
Columbia.
Conemaugh.
Coralia, loading at Escanaba Ore Dock. (Size 17x21—Price $2.00).
Corsica.
Corona.
John Craig.
M. M. Drake.
Eastern States. (Launch).
Eastern States on First Trip. (Three Views—Broadside, Bow and Stern).
Eastern States. (On the Ways—Three Views).
Isaac L. Ellwood.
Excelsior. (Detroit Ferry).
H. C. Frick.
Garland. (Detroit Ferry).
Greyhound.
Harlem.
Harvard. (On the Ways).
Harvard. (The Launch).
Harvard. (In the Slip—Two Views).
Helena.
Hennepin.
Islander. (Thousand Islands—Two Views).
Frank E. Kirby at Put-in-Bay.
Lackawanna.
Mahoning.
Hahoning.
Michigan Central in Detroit River. (Winter).
Mohawk.
Montana.
W. B. Morley, wreck in Detroit River, Aug. 6, 1899.
Simon J. Murphy. (On the Ways).
Simon J. Murphy. (On the Ways—Two Views).
Simon J. Murphy, Launch. (Bow in Slip, Stern not yet in Water).
Neshoto.
New Island Wanderer. (Thousand Islands).
New York. (Thousand Islands—Two Views).
North King. (Thousand Islands).
North Land, in the "Soo" Locks. (Two Views).
North Land, at Mackinac Island. (Two Views).
North Land and North West in Winter Quarters.
Ongiara. (Two Views).
Peerless, at Mackinac Island.
Pere Marquette No. 17.
Plankinton at Northwestern Coal Docks, Duluth.
Pleasure, at Dock (Detroit Ferry).
E. C. Pope.
Princeton.
Ramapo.
W. D. Rees.
Rube Richards, in Ship Canal at Duluth.
St. Lawrence (Thousand Islands).
Ste. Marie, in Mackinac Straits.
Howard L. Shaw. (On the Ways—Three Views).
Howard L. Shaw. (The Launch).
Howard L. Shaw. (In the Slip).
Sir William Siemens.
George Stone.
Tashmoo. (In Dewey Naval Parade, Detroit River).
Tashmoo, June 9, 1900.
Tashmoo. (Entering St. Clair Flats Ship Canal).
Tashmoo. (Landing at Star Island.—Two Views).
Toronto. (Thousand Islands).
Toronto. (Thousand Islands—at Alexandria Bay).
Toronto. (Thousand Islands—at Gananoque).
Transport, in Detroit River, Winter. (Car Ferry—Two Views).
Troy.
Uganda, in Ship Canal at Duluth.
United Empire.
Capt. Visger. (Thousand Islands).
E. P. Wilbur.
Western States. (Size 10x18—Price $1.50.
Yosemite.

ORDER FROM
MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

Photographs of Marine Scenes on the Great Lakes.

Negative size of the following Photographs is 7x9 inches. Sent to any address, postpaid at 75 cents each.

ASHTABULA, OHIO.
Harbor Entrance.
L. S. & M. S. Ry. Ore Docks.
L. S. & M. S. Ry. Ore Docks—unloading ore.
L. S. & M. S. Ry. Ore Docks—ore on docks.
Car Dumping Machine, two views.
Fueling Lighter with Clam Shell Hoist.

BUFFALO, N. Y.
Harbor Entrance.
City Ship Canal.
Great Northern Elevator and Shipping.
Great Northern Elevator—unloading grain.
River and Elevators.
River and Elevators, foot of Michigan St.
River and Elevators, foot of Main St.
C. & B. Line Freight Sheds.
Northern Steamship Co.'s Winter Quarters.
"An Old Timer" at C. T. T. Elevator.
Lackawanna Coal Chutes, two views.
Lackawanna Ore Docks—unloading ore.
Lackawanna Ore Docks—unloading ore and loading coal.
Unloading Ore from Whaleback, two views.
Unloading Wheat into Elevators, two views.

CHICAGO, ILL.
Chicago River Elevators.
Lake Front, from Illinois Central Station.
Illinois Steel Works and Harbor Entrance, South Chicago.

CLEVELAND, O.
Cleveland Harbor from Lake View Park.
American Steel & Wire Co.'s Plant.
Ellsworth Coal Chutes-Dumping Car, two views
Cleveland & Pittsburg Ore Docks, two views.
Ore Docks and Harbor, two views.
Unloading Ore, two views.
Globe Iron Works Ship Yard.
Globe Iron Works Ship Yard, Laying Keel of No. 400.

CONNEAUT, O.
Harbor Entrance.
Unloading Ore—Brown Conveying Hoists, two views.
Unloading Ore—Clam Shell Plant.
Car Dumping Plant, two views.

DETROIT, MICH.
Winter in Detroit River.
Car Ferry turning in ice—two views.
"Michigan Central" entering slip.

DULUTH, MINN.
Great Northern Elevator.
Peavey Elevator.
Ship Canal (Looking in) Two views.
Ship Canal (Looking out.)
Flour Mills.
Northwestern Coal Docks.
Philadelphia & Reading Coal Docks.
The Harbor.
The Bluffs.
"Last Trip From Duluth."

ERIE, PA.
Anchor Line Docks and Pennsylvania R. R. Co.'s Ore and Coal Docks.
Pennsylvania R. R. Coal Trestle.
Pennsylvania R. R. Co.'s Docks. Unloading Ore
Hanna's Ore Plant.
Coal Trestle and Car Dumping Plant.

OSWEGO, N. Y.
Coal and Ore Docks.

ST. CLAIR FLATS.
Str. Tashmoo Entering Ship Canal.
A Freighter Leaving Ship Canal.
Lake Vessels Old and New.
Nightfall on the River.
A Lumber Tow.

SAULT STE. MARIE, MICH.
General View of Locks from Offices.
Poe Lock, from below, closed.
Poe Lock, from below, open.
Poe Lock, from above.
Poe Lock, with Whaleback.
Weitzel Lock, from above.
Weitzel Lock, from below.
Str. North-Land Passing Locks, two views.
Upper Entrance to Lock Canal.
Gate Mechanism.
Interior of Power House.
Canadian Lock from Upper End.
Canadian Lock from Lower End.
The Rapids, looking up.
The Rapids, looking across.
Indians fishing in the rapids.

PANORAMIC VIEWS.—7x17 inches at $1.75 each.
Lackawanna Ore Docks—Unloading ore.
American Steel & Wire Co.'s Plant, Cleveland.
Ore Docks and Harbor, Cleveland.
Ore Docks, Cleveland.
Water Front, Detroit, from Windsor.
Coal and Ore Docks at Oswego.

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

Generated on 2024-08-27 16:04 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Dake Engine Co.....Grand Haven, Mich.

AIR PUMPS AND APPLIANCES

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd....Philadelphia.
Pittsburg White Metal Co.....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILEDS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Detroit Shipbuilding Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Boston.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Brown, Harvey L.....Buffalo.
Faust, Lieut., Wm. H. .....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Heyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co.....Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Dreln, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co., ...
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co.....Grafton, Ill.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer's Sons, L. .....New York.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Great Lakes Engineering Works.....Detroit
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works Oswego, N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Newport News Ship Building Co Newport News, Va.
Northwestern Steam Boiler & Mfg. Co.. Duluth, Minn
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co..New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co. .....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOOKS, NAUTICAL AND ENGINEERING.

Audel & Co., Theo.....New York.
Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works .....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Wellman-Seaver-Morgan Co. .....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CARPETS, FURNITURE, BEDS, ETC.

Siegel Cooper Co .....New York.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co. .....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co. .....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM.

With Steam Heating Attachment.
Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Bliss, John & Co.....New York.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Wellman-Seaver-Morgan Co.....Cleveland.

COMPASSES.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Smith, Capt. W. J. .....Seattle, Wash.
McNevin, Alfred D.,.....Detroit.

CONDENSERS.

Thropp & Sons Co., John E. .....Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

COPPER, TIN AND SHEET IRON WORK.

McCutcheon, C. H.....Buffalo.
Rippley Hardware Co.....Grafton, Ill.

CORDAGE

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot .....Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

DISTANCE FINDER.

Nicholson Ship Log Co.....Cleveland, O.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works .....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....New York.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co Newport News, Va.

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Northwestern Steam Boiler & Mfg. Co., Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
MacLean Hydraulic Signal Co.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. .....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
McCutcheon, C. H. .....Buffalo.
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co., Duluth, Minn.
Reilly Repair & Supply Co., James....New York.
Rippley Hardware Co ..... Grafton, Ill.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Garrett-Cromwell Engineering Co.....Cleveland.
Gaskin, Edward .....Buffalo.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Matteson & Drake..... .....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. .....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V.....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo.
Reilly Repair & Supply Co., James....New York.
Rose Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co..... Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B. & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GALLEY UTENSILS.

Siegel Cooper Co.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GROCERIES AND SUPPLIES.

Siegel Cooper Co..... New York.

HATCH FASTENERS.

Mulholland, Capt. M.,.....Cleveland.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works..... Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ..New York and Chicago.
Richardson, W. C. ..... Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H. ..... New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co..... New York
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co ..... Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

LOGS.

Bliss, John & Co..... ..... New York.
Nicholson Ship Log Co. .....Cleveland.
Walker & Sons, Thomas .....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..... Jersey City, N. J.

LUBRICATORS.

Crane Co .....Chicago.
Lunkenheimer Co .. .. Cincinnatti.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Lockwood Mfg. Co .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co. .....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. .....New York.
Siegel Cooper Co .....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H. .....Baltimore, Md.
Detroit Ship Building Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. .....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School..... ..... Chicago.
McNevin's Navigation School..... .....Detroit
McNevin's Navigation School.....San Francisco.
Seattle Nautical School .....Seattle, Wash.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph ..... Duluth, Minn.
Logan, Robert ..... Cleveland.
Matteson & Drake..... .....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. ..... New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co. .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B .....Allegheny, Pa.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.
United States Graphite Co..... Saginaw, Mich.

PACKING.

Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co. .....New York.
United States Metallic Packing Co...Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co. ..... Detroit.
Detroit White Lead Works ....Detroit.
New Jersey Zinc Co. ..... New York.
Sipe & Co , James B.....Allegheny, Pa.
United States Graphite Co..... .....Saginaw, Mich.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE-JOINT COMPOUND.

United States Graphite Co..... Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co. .....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co..... Cleveland.

PLUMBING, MARINE.

Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son.....New York.

PNEUMATIC TOOLS.

Allen, John F. .....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston

Generated on 2024-08-27 15:53 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Phosphor Bronze Smelting Co., Ltd. ..Philadelphia.
Risdon Iron Works.....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Shipbuilding Co .....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co.....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

RANGES.

Russell & Watson .....Buffalo.
Siegel Cooper Co.....New York.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping.New York.

RIVETING MACHINES.

Allen, John F .....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS, NAUTICAL.

Chicago Nautical School.....Chicago.
McNevin's Navigation School .....Detroit.
McNevin's Navigation School.....San Francisco.
Seattle Nautical School.....Seattle, Wash.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co. .....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Shipowners Dry Dock Co. .....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. ..... New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. .....New York.
Holmes, Samuel .....New York.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal, Can.
Newman, R. L. .....New York.
Weeks, F. H. .....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Erie & Western Trans. Co. .....Buffalo.
Goodrich Trans. Co. .....Chicago.
International Mercantile Marine Co .. Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co. .....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Moulton Steering Engine Co..... ....New York.
Sheriffs Mfg. Co. .....Milwaukee.

STOCKS, BONDS, SECURITIES.

Fahey & Co. .....Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. .....Boston.
Schrader's Son, A. .....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Matteson & Drake ... .Philadelphia.
Newman, R. L. .....New York.
Wood, W. J. .....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. .....Chicago.
Pittsburg Testing Laboratory Ltd. .....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. .....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .....New York.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc. .....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co. .....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Lunkenheimer Co. ..... Cincinnati.
Sturtevant Co., B F, Jamaica Plain. .....Boston.

TRUCKS.

Boston & Lockport Block Co. .....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co. .....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Bordo, L. J. .....Philadelphia.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Detroit Varnish Co..... Detroit.
Detroit White Lead Works..... Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Boland, John J. .....Buffalo.
Brown & Co. .....Buffalo.
Elwell, Jas. W. & Co. .....New York.
Elphicke, C. W. & Co. .....Chicago.
Fleming & Co., P. H. .....Chicago.
Hall & Root .....Buffalo.
Helm & Co., D. T. .....Duluth.
Hawgood & Co., W. A. .....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal.
Newman, R. L. .....New York.
Mitchell & Co. ..... Cleveland
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. .....Boston.

VESSEL FURNISHINGS.

Siegel Cooper Co .....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. .....Buffalo.
DeGrauw, Aymar & Co. .....New York.
Upson-Walton Co. .....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Lunkenheimer Co. ..... Cincinnati.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co. .....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co...Kingston, Ont.
Midland Towing & Wrecking Co., Ltd..Midland, Ont.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son .....Wilmington, Del.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....New York.
Rippley Hardware Co.....Grafton, Ill.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

YAWLS.

Drein, Thos. & Son .....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

Generated on 2024-08-27 15:58 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW AND MARINE RECORD.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.

*Allen, John F. 4
Almy Water Tube Boiler Co.... 15
American Bureau of Shipping..... 8
American Injector Co 10
American Line 3
American Ship Building Co..... 1
American Ship Windlass Co..... 2
American Steam Gauge Co..... 1
Anchor Line 45
Armstrong Cork Co..... 48
Ashton Valve Co..... 16
Atlantic Works 5
*Atlantic Works, Inc..... 6
Audel & Co., Theo..... 47

Babcock & Wilcox Co..... 15
Baldt Anchor Co. 9
Baker, Howard H. & Co..... 48
Bartlett & Snow Co., C. O..... 2
Bath Iron Works, Ltd..... 1
Bertram's Oil Polish Co..... 1
Blake, Geo. F., Mfg. Co..... 9
*Bliss, John & Co..... 13
*Bloomsburg & Co., H..... 9
Boland, J. J..... 40
Bordo, L. J..... 13
*Boston & Lockport Block Co.... 32
Bourne-Fuller Co. 16
Bowers, L. M. & Co..... 9
*Boyer's, L. Sons 48
Brown, Harvey L. 40
Brown & Co. 40
Brown Hoisting Machinery Co., Inc. 2
Buffalo Dredging Co. 37
Buffalo Dry Dock Co..... 46

Chase Machine Co. 7
*Chelsea Clock Co..... 3
Chicago & Gt. L. Dredge & Dock Co. 37
Chicago Nautical School. 37
Chicago Ship Building Co..... 46
Cleveland City Forge & Iron Co.. 9
Cleveland Trust Co. 36
Continental Iron Works 2
Cory, Chas. & Son 12
*Craig Ship Building Co..... 13
Cramp, Wm. & Sons, S. & E. B. Co. 1
*Crandall & Son, H. I. 4
Crane Co. 7-13

Dake Engine Co. 12
Dearborn Drug & Chemical Wks. 14
DeGrauw, Aymar & Co..... 9
Delauney, Belleville & Co..... 31
Delaware River Iron S. B. & E. Works. 5
Detroit Ship Building Co..... 1
Detroit White Lead Works..... 1
Dixon Crucible Co., Joseph..... 12
Donnelly Salvage & Wrecking Co. 8
Drein, Thos. & Son..... 4

Elphicke, C. W. & Co..... 40
Elwell, Jas. W., & Co..... 40
Elwell-Parker Electric Co. 2
Erie & Western Trans. Co. 45

Fahey & Co. 30
Falls Hollow Staybolt Co..... 7
Faust, Wm. H.... 40
Federal Trust Co. 36
Fix's S., Sons 37
Fleming & Co., P. H..... 40
Fletcher, W. & A. Co..... 4
Fogg, M. W. 4
Fore River Ship & Engine Co.... 5
Forest City Boiler Co 37

Garrett-Cromwell Engineering Co. 3
Gaskin, Edward 40
General Electric Co. 16
Gilchrist, Albert J. 40
Goodrich Trans. Co..... 45
Goulder, Holding & Masten..... 40
Great Lakes Engineering Works. 34
Great Lakes Register 8

Hall & Root 40
Hanna, M. A. & Co..... 38
Hardy, Wm. A. 4
Hawgood & Co., W. A..... 40
Hayden Mfg. Co., N. L..... 37
Helm & Co., D. T..... 40
Helvig, H. A. J..... 3
Herriman, F. D. 8
Holmes, Samuel 40
Hoyt, Dustin & Kelley 40
Hunt, Robert W. & Co..... 41
Hutchinson & Co. 40
Hyde Windlass Co. 48

International Mercantile Marine Co. 3
Ironville Dock & Coal Co. 38

Jenkins Brothers 16
Jenks Ship Building Co..... 47

Kahnweiler's Sons, David..... 4
Katzenstein, L. & Co..... 3
Kidd, Joseph 40
*Kieley & Mueller..... 13
Kingsford Foundry & Machine Works 14
King, Rufus S. 40
Kremer, C. E. 40

Lake Erie Dredging Co..... 37
Lane & DeGroot 4
*Learmonth, Robert 3
Lidgerwood Mfg. Co. 6
Lockwood Mfg. Co. 5
Logan, Robert 41
L. S. & M. S. Ry..... 45
Lunkenheimer Co. 12

McCarthy, T. R. 40
McCurdy, Geo. L. 8
McCutcheon, C. H. 13
McNevin, Alfred D'A.,..... 36
Macbeth Iron Co. 48
MacDonald, Ray G. 40
MacLean Hydraulic Signal Co..... 6
Manitowoc Dry Dock Co. 5
Marine Construction & Dry Dock Co. 5
*Marine Iron Co. 38
Martin-Barriss Co. 9
Maryland Steel Co. 5
Matteson & Drake..... 41
Midland Towing & Wrecking Co., Ltd. 48
Milwaukee Dry Dock Co. 46
Mitchell & Co. 40
*Moran Bros. Co. 47
Morse & Son, A. J. 33
Mosher, Chas. D. 41
Moulton Steering Engine Co..... 13
Mulholland, Capt. M., ... 11

Newman, R. L. 40
Newport News Ship Building & Dry Dock Co. 5
New Jersey Zinc Co. 7
New York Belting & Packing Co. 48
Nicholson Ship Log Co..... 13
North River Iron Works 4
Northwestern Steam Boiler & Mfg. Co. 14

Peck, Chas. E. & W. F..... 3
Penberthy Injector Co..... 10
Pere Marquette R. R. & S. S. Line 45
Phosphor Bronze Smelting Co. Ltd. 1
Pickands, Mather & Co. 38
Pinney & Warner 40
Pittsburg Coal Co. 39
Pittsburg Testing Laboratory, Ltd. 41
Pittsburg White Metal Co..... 33
Potter, J. D..... 3
Powell, Ambrose V. 41

Record of American & Foreign Shipping 8
Red Star Line 3
Richardson, W. C. 40
*Reilly Repair & Supply Co., Jas. 9
*Rippley Hardware Co..... 32
Risdon Iron Works 5
*Ritchie & Sons, E. S..... 13
Roach's Ship Yard 5
Roberts Water Tube Boiler Co.. 15
Rochester & Pittsburg Coal & Iron Co. 39
Roelker, H. B. 5
Ross Valve Co. 12
Russell & Watson 6

Sadler, Perkins & Field..... 41
Safety Car Heating & Lighting Co. 1
Sands, Alfred B. & Son..... 12
Scherzer Rolling Lift Bridge Co. 9
Schrader's Sons, A. 16
Seaboard Steel Casting Co. 32
Seattle Nautical School..... 37
Shaw, Warren, Cady & Oakes.... 40
Shelby Steel Tool Co..... 14
Sheriffs Mfg. Co. 8
Shipowners Dry Dock Co. 16
Shipping World..... 10
Shurick, F. S. 33
Siegel Cooper Co..... 32
Sipe & Co., James B..... 7
*Smith & Son, Abram.....38
Smith Co., L. P. & J. A..... 36
Smith Coal & Dock Co., Stanley B. 39
Smith, Stanley B. & Co..... 39
Smooth-On Mfg. Co. 9
Standard Chain Co. 6
*Standard Oil Co. 13
Stirling Co. 15
Stratford Oakum Co., Geo. 6
Sturtevant, B. F. Co. 48
Sullivan & Co. 40
Superior Ship Building Co..... 46

Taylor Water Tube Boiler Co... 15
Thropp, J. E. & Sons Co..... 12
Thurston & Bates 41
Trout, H. G. 8
Truscott Boat Mfg. Co. 5

Union Machine & Boiler Co..... 38
Upson-Walton Co. 48
U. S. Metallic Packing Co..... 48
U. S. Shipbuilding Co..... 4

Walker, Thomas & Son..... 8
Warrington Iron Works 5
*Watson-Stillman Co. 47
Weeks, F. H. 40
Wellman-Seaver-Morgan Co..... 2
Westinghouse Electric & Mfg. Co. 16
White, Johnson, McCaslin & Cannon 40
*Willard, Chas. P. & Co..... 5
Wood, W. J. 40

Youghiogheny & Lehigh Coal Co.. 39

PERE MARQUETTE
R. R. & STEAMSHIP LINE

Chicago, Milwaukee, Manitowoc, and Grand Rapids, Saginaw, Port Huron, Detroit, Toledo

H. F. MOELLER, Gen'l Passenger Agent
Send for folder. DETROIT, MICH

The Erie & West. Transportation Co.
ANCHOR LINE.

PASSENGER SERVICE Steamers.
India. China. Japan. Tionesta.

PORTS OF CALL.

Buffalo.	Erie.	Cleveland.
Detroit.		Mackinac Island.
Sault Ste. Marie.	Marquette.	Houghton.
Hancock.	Duluth.	

FREIGHT SERVICE Steamers.

Alaska.	Codorus.	Mahoning.
Schuylkill.	Conestoga.	Clarion.
Delaware.	Juniata.	Lehigh.
Lycoming.	Susquehanna.	Wissahickon.
Conemaugh.		

PORTS OF CALL.

Buffalo.	Erie.	Cleveland.
Detroit.	Sault Ste. Marie.	Marquette.
Houghton.	Hancock.	Duluth.
W. Superior	Chicago.	Milwaukee.

CHAS. E. MARKHAM, General Passenger Agent, Buffalo, N. Y.
J. C. EVANS, Western Manager, Buffalo, N. Y.

LAKE SHORE & MICHIGAN SOUTHERN RY.

Eastward.	Arrive from West	Depart East.
No. 18, Southwestern Lim	.....	1:50am
No. 22, Lake Shore Lim...	*2:12am	*2:20am
No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 48, Ac via Sandusky..	†1:40pm	.. ..
No. 44, Cleve. & N. Y Sp.	*3:00pm	.....
No. 46, Southwestern Ex.	....	*3:10pm
No. 116, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim.....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.....	†9:10pm	†9.25pm
No. 126, Norwalk Accom.	†8:10am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	.....
No. 7, Day Express..	.....	†6:00am
No. 15, Bost & Chi Sp.....	*3:05am	*3:15am
No. 19, Lake Shore Lim..	*7:05am	*7:15am
No. 23, Western Express.	*10:30am	*10:35am
No. 29, Southwestern Sp.	†11:10am	.....
No. 31, U S Express.....	‡11:55am	‡12:05am
No. 33, Southwestern Ex	*12:25pm	.....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47 Accomodation.....	†11.00am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37, Pacific Express...	*6:50pm	*7:20pm
No. 3, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday. ‡ Except Monday.
Trains Nos. 23, 28 and 37 run via Erie Station.
City Ticket Office, 237 Superior St.

CHICAGO
To MILWAUKEE
GRAND RAPIDS
MUSKEGON and
GRAND HAVEN
City Ticket Office 103 Adams St.
Docks Foot of Michigan Avenue

Generated on 2024-08-27 16:02 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

WILLIAM L. BROWN, President. J. C. WALLACE, Vice-Pres. O. R. SINCLAIR, Sec'y & Treas. ALFRED G. SMITH, Gen'l Supt.

CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.
Ship Yard and Dry Dock Office, "South Chicago 40."
Chicago Office, 1125 Rookery, "Harrison," 1207.

Steel Ship Builders and Dry Dock Proprietors.

Dry Dock and Yards: 101st St. and Calumet River, - - - - CHICAGO, ILL.

MILWAUKEE DRY DOCK COMPANY

MILWAUKEE, WISCONSIN

SHIP REPAIRS

OF ALL KINDS

Two Ship Yards offer every Facility for the Repair of both Steel and Wooden Vessels

South Yard Dock....
is 450 ft. long on keel blocks; 460 feet over all; 60 feet width of gate, and 16 feet over sill.

West Yard Dock....
312 feet on keel blocks; 45 feet width of gate, and 12 feet over sill.

RUDDER PIT IN EACH DOCK.
ELECTRIC LIGHTS FOR NIGHT WORK.

Main Office at **SOUTH YARD,**
Foot of Washington St.

EDWARD SMITH, President. WILLIAM KNIGHT, Asst. Sec'y & Treas. W. T. NEVINS, Superintendent.

THE BUFFALO DRY DOCK CO.

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-ton Shear Legs, and in every way Equipped

WITH MODERN PLANT FOR

The Building and Economical Repairs of

STEEL AND WOODEN SHIPS

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 518 Seneca. President's Telephone, 279 Seneca, Office. President's Telephone. 209 Bryant, Residence.
Asst. Sec'y & Treas., Telephone, 609 Bryant, Residence. Superintendent, Telephone, 108 South, Residence.

THE SUPERIOR SHIPBUILDING COMPANY

Dry Dock and Repairs of All Kinds	SHIP AND ENGINE BUILDERS	Two Largest Dry Docks On the Lakes

Large Stock of Material Always on Hand for Repairing Wooden and Metal Ships.

Repairing Promptly Attended to, Night or Day.

West Superior, Wis.

Generated on 2024-08-27 15:54 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from NEW YORK PUBLIC LIBRARY

The Jenks Ship Building Co.

STEEL SHIP BUILDERS,

MARINE ENGINES AND BOILERS.

Prompt Attention Given to Repairs of all Kinds on Ships, Engines and Boilers.

OFFICE AND MACHINE SHOPS AT FOURTH STREET.

YARDS AT FOOT OF LINCOLN AVENUE.

PORT HURON, = = MICHIGAN.

MORAN BROS. COMPANY

SEATTLE, WASHINGTON

SHIP AND ENGINE BUILDERS

STEEL AND WOOD VESSELS, STEAM OR SAIL
FOR OCEAN, SOUND AND RIVER SERVICE

FOUNDRY, MACHINE, BOILER AND FORGE SHOPS

LARGEST TOOLS AND EQUAL TO ANY REQUIREMENT
HEAVY FORGINGS A SPECIALTY

DRY DOCK AND MARINE RAILWAY

Two-Section balanced floating dry dock, 400 ft. long, 60 ft. between towers; patent steel wedge keel blocks; 12,000 tons displacement.
CAPACITY OF MARINE RAILWAY 1500 TONS

SHIP CHANDLERY, ENGINEERS' SUPPLIES

SAW AND PLANING MILL

CAPACITY: TIMBER, 48 INCHES SQUARE, 125 FEET LONG
including every description of ROUGH, DRESSED or KILN DRIED

YELLOW FIR, RED CEDAR OR SPRUCE

We make a specialty of long and large timber and can DRESS FOUR SIDES 20 x 30 INCHES.

SPARS THE LONGEST, LARGEST, CLEAREST AND BEST IN THE WORLD; ROUGH OR HEWN.

PILES OR TIMBER OF ANY DESCRIPTION.

CARS FROM ALL TRANSCONTINENTAL ROADS
ENTER OUR YARDS AND DOCKS

DOCK SHIPMENTS TO ALL PARTS OF THE WORLD

ELECTRIC CRANE Capacity to transfer 75 tons from car to vessel

WE INVITE CORRESPONDENCE

SUPPLIED $1 MONTHLY

Hawkins' Series

are the most complete library of practical books published for Engineers, Firemen, Electricians and Machinists.

Treating on Steam Engineering in all its branches, including questions and answers; Electrical Engineering and Self-Help Mechanical Drawing.

Complete catalog giving special terms and prices sent free upon request.

for Engineers.

THEO. AUDEL & CO.
Educational Books
63 Fifth Avenue New York City

EIGHTH REVISED EDITION.

Scott's Coast Pilot for 1903.

Great Lakes and Connecting Waters.

At $1.50.

For sale by MARINE REVIEW PUB. CO.

Nautical Encyclopedia
PRICE $3.00.

Is in all respects a work up to date, correct as to every term known to the shipping world.

Divided as to departments of Naval Architecture, Marine Engineering, etc.

SENT ON APPROVAL.
CARRIAGE PREPAID

ORDER FROM
THE MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., CLEVELAND.

"Steel Ships

THEIR CONSTRUCTION AND MAINTENANCE."

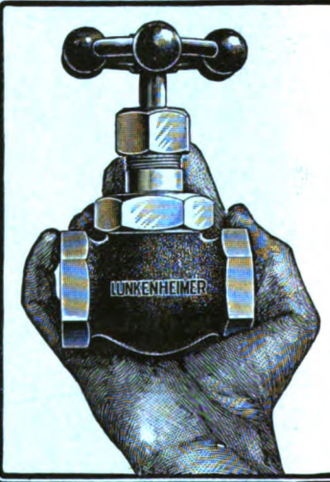
A valuable work, just from the press, by THOMAS WALTON, Author of "Know Your Own Ship."

Not highly technical, but well suited to Ship Superintendents, Marine Engineers, and students of ship construction.

INTRODUCTION deals with steel from its crude state in ore to finished product in ship material. Then follows chapters dealing with principal structural features and alternative modes in which a vessel may be built. Largest section of the book treats in detail of the construction and combination generally of the various parts which go to make up the whole ship structure—framing, plating, stern frames and rudders, riveting, pumping and ventilation and includes also remarks upon launching

Price, $5.50.

THE MARINE REVIEW PUB. CO.
CLEVELAND, O.



LUNKENHEIMER REGRINDING VALVES

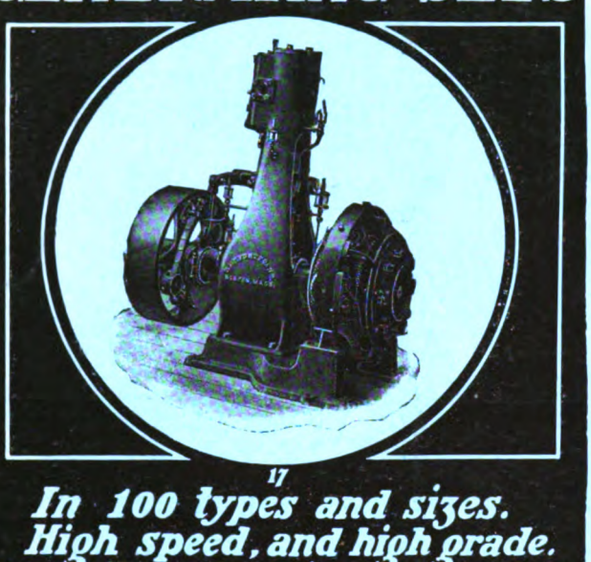
Made of Gun Metal, are unsurpassed where thorough, reliable service is the first requisite. In screw and flange ends for 200 and 350 lbs. working pressure, ⅛ inch up. A trial order demonstrates their peculiar fitness and invariably results in their adoption. These valves are extensively used and in continuous service in the United States Navy, locomotives, lake and river boats, high-pressure power plants, etc. Specify Lunkenheimer Make

THE LUNKENHEIMER CO
CINCINNATI, U.S.A.

Branches: 26 Cortlandt St., New York.
35 Great Dover St. London, S.E.
Write for Catalog

Generated on 2024-08-27 15:58 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY

STURTEVANT GENERATING SETS



In 100 types and sizes.
High speed, and high grade.
We build both engine & generator.
Send for Bulletin G.

B. F. STURTEVANT CO. BOSTON.
NEW YORK · PHILADELPHIA · CHICAGO · LONDON.

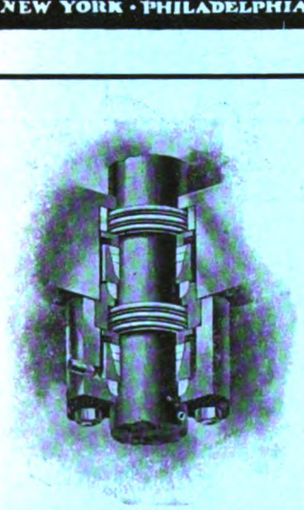
INTERLOCKING RUBBER TILING.

Is noiseless, non-slippery, waterproof and thoroughly sanitary, more durable than stone or earthen tiles, elegant in appearance, manufactured in a carefully selected variety of colors. Endorsed by the best architects and engineers. A perfect floor for business offices, banking-rooms, court-rooms, vestibules, halls, billiard-rooms, smoking-rooms, cafes, libraries, churches, hospitals, hotels, etc. It is especially and peculiarly adapted for Steamships, Yachts, etc. It stands the constant straining and racking without cracking or separating, and its non-slippery feature is of high value. Samples, estimates and special designs furnished upon application. Sole manufacturers.

NEW YORK BELTING & PACKING CO. Ltd.

25 PARK PLACE · · · · NEW YORK

PHILADELPHIA, 724 Chestnut St. BOSTON, 232 Summer St.
BALTIMORE, 41 South Liberty St. INDIANAPOLIS, 229 So. Meridian St.
CHICAGO, 150 Lake St. ST. LOUIS, 411 No. Third Street.
SAN FRANCISCO, 509-511 Market St.



Class No. 1 Packing.

United States Metallic Packing Co.

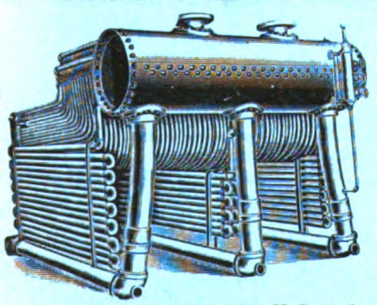
427 NORTH 13TH ST.
PHILADELPHIA, PENN.

SEND FOR CATALOG

CHICAGO
509 Great Northern Building

FOR
SATISFACTORY
Wire Mooring Lines

CALL ON
THE UPSON-WALTON CO.
CLEVELAND.



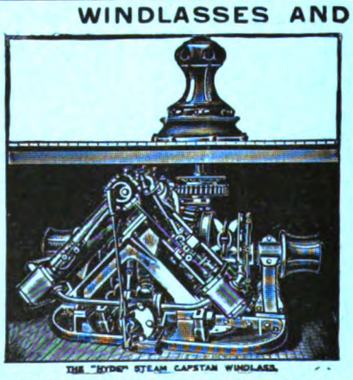
Perspective view of the 250 H. P. boiler built for the steam freighter "Clara," having 6 ft. space and 8 ft. length; 34.4 sq. ft. of grate area and 1,900 sq. ft. heating surface; weight of boiler and water, 14,000 lbs. Replaced a return tubular boiler, thereby saving in dead-weight of boiler and water, 16½ tons. The Clara now has 14 in. less draft and an increased earning capacity of $10 per day.

Boyer Sectional Water Tube Boilers are of an entire new design, are simplest in construction, are accessible to all parts, are rapid steamers with short circulation, have low center of gravity, have no joints in the fire, have no dead ends, occupy less space in width, length and height than any other, are easily fired, can be repaired or set up by any ordinary mechanic, do not require a brick casing, and are shipped whole or knocked down into packages for transportation by man or beast.

Kindly mention this paper.

L. BOYER'S SONS,
90 Water Street, : NEW YORK, N. Y.

WINDLASSES AND CAPSTANS



THE "HYDE" STEAM CAPSTAN WINDLASS.

The Hyde Steam and Power Windlasses and Capstans are the best in the market.

They have been selected for most of the vessels now building for the Navy Department, Revenue Marine, Light-house Board and United States Coast Survey.

They are being furnished for the majority of the highest class Steam Ships, Merchant Vessels and Yachts now building.

HYDE WINDLASS COMPANY, : BATH MAINE.

LIFE PRESERVERS—BUOYS.

Acme. Solid Cork. Granulated Cork. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed. Orders filled promptly.

ARMSTRONG CORK COMPANY.
Boston. New York. Philadelphia. Pittsburg. Chicago.
St. Louis. Baltimore.

Midland Towing and Wrecking Co., Ltd.
MIDLAND, ONT., CANADA.

JAMES PLAYFAIR, { Pres't and Gen. Mngr.
D. L. WHITE, Vice-President.
J. W. BENSON, Sec'y and Treas.

First-Class Tugs for Wrecking, Raft Towing, Etc. Steam Pumps, Divers, Jacks, Hawsers, Lighters.

THE MACBETH IRON CO.
57 WEST CENTER ST. CLEVELAND, OHIO

PROPELLER WHEELS SOLID AND SECTIONAL
AETNA GRATE BARS, TIMBERHEADS, CHOCKS, ETC.

ENGINEERS, FOUNDERS AND MACHINISTS.
HEAVY FORGINGS
ENGINE REPAIRS.

SHIP CHANDLERS AND SAIL MAKERS
18 to 26 TERRACE.

Generated on 2024-08-27 16:02 GMT / https://hdl.handle.net/2027/nyp.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from NEW YORK PUBLIC LIBRARY